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Human capital, age and job stability: evidence from Spanish certified auditors (1976–1988)

Nieves Carrera, Salvador Carmona, Isabel Gutiérrez*

Abstract—During the period 1976–1988, Spain witnessed pervasive transformations that led the country from a military dictatorship to a fully-fledged democracy. In turn, the audit profession experienced high demand which doubled the number of members of the Institute of Sworn Auditors of Spain (Instituto de Censores Jurados de Cuentas de España). In this unique social laboratory, we draw on the insights of human capital theory and the entrepreneurship literature to examine the profile of newly certified auditors at the time of receiving the audit certificate that enabled them to (i) become a licensed auditor and engage in public practice, or (ii) become an unlicensed auditor and leave the profession immediately after receiving the professional qualification. Our results indicate that those Spanish auditors who had high general or specific human capital and job stability and were at the younger or older ends of the age continuum were less likely to apply for audit licences than their counterparts (i.e. low general or specific human capital, middle-aged, and unstable jobs).

Keywords: auditors; audit market; human capital theory; entrepreneurship; Spain

1. Introduction

Following the end of General Franco's dictatorship in November 1975, Spain witnessed '... the most rapid and pervasive transformations, with no aspect of social, economic and political life remaining untouched.' (Bougen and Vázquez, 1997: 3). These transformations impinged on the audit market, which experienced high growth amid the steady process of deregulation and professional reforms that culminated in the enactment of the Spanish Audit Law in 1988 (Bougen, 1997; García-Benau et al., 1998, 1999). The reforms created a 'new' and modern auditing profession and played an instrumental role in the booming demand for audit services in Spain during the period 1976–1988. From its inception in 1942 until 1976, the Institute of Sworn Auditors of Spain (Instituto de Censores Jurados de Cuentas de España (ICJCE)) had registered 2,626 newly certified auditors. This figure doubled (5,255) in just 13 years (1976–1988). This situation, characterised by a mix of regulatory uncertainty and strong job market prospects, constitutes a unique social laboratory in which to examine the profile of newly certified auditors.

As in many other countries (e.g. France: Margerison and Moizer, 1996), the audit profession in Spain is separate from the accounting profession. In this setting, audit certification constitutes a prerequisite for applying for an audit licence and becoming a 'licensed auditor' (Ramírez, 2001).[1] During the observation period, to earn an audit certificate and become a newly certified auditor of the ICJCE, a person needed to: (i) be a Spanish citizen; (ii) be 18 years of age or older; and (iii) hold a university degree or equivalent. In addition, there were requirements to have: (iv) passed a series of qualification exams, which include subjects such as financial accounting, management accounting, finance, and auditing; and (v) never been convicted of a crime. Importantly, the ICJCE's by-laws approved in 1943 did not include professional experience as a prerequisite for receiving the audit certificate. Upon meeting these

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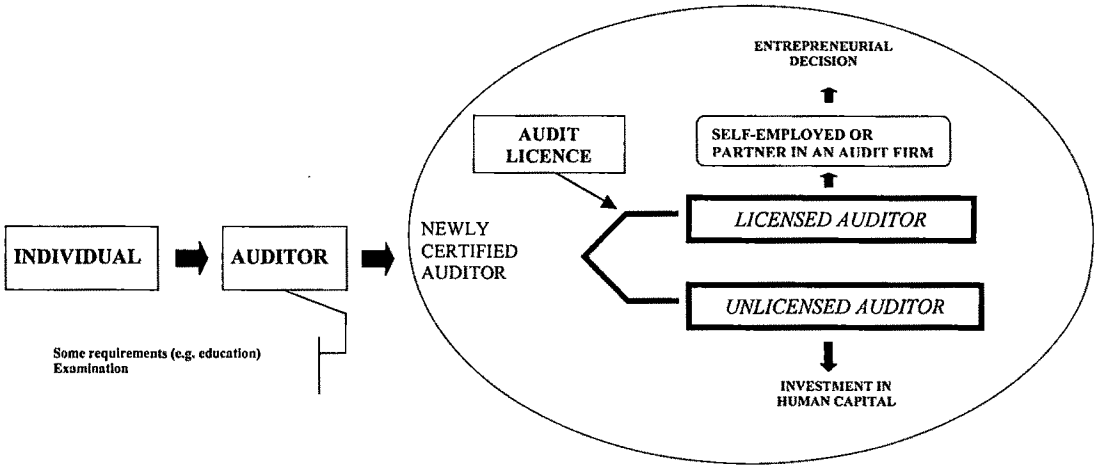
[1] This is equivalent to the concept of 'responsible individuals' found in the UK.

Figure 1
The process for engaging in audit practice



requirements, successful candidates were granted an auditing certificate and gained membership into the ICJCE. Newly certified auditors, therefore, could then either apply for an auditing licence that would enable them to sign audit reports (*ejercientes*; licensed auditors) or register as an unlicensed auditor (*no ejercientes*; unlicensed auditors) (see Figure 1). Our study focuses on a specific point in the auditor's life (Carroll and Mosakowski, 1987): the point at which newly certified auditors decided whether to apply for an auditing licence. 'Unlicensed auditors' could leave the profession and obtain work in other sectors (e.g. public sector, academia, and industry), or perform support activities in consultancy and auditing firms. None of these activities required them to hold an audit licence (see Figure 1). At that point in time, we compare the individual profile of 'licensed' versus 'unlicensed' auditors.

Licensed auditors (i) must be on file in the official tax register of the Ministry of Finance as a freelance auditing professional, and (ii) must have obtained acceptable insurance coverage for professional indemnity. Licensed auditors offer their professional services either as self-employed auditors or as partners in auditing firms. In this manner, they become business owner-managers in the audit market and, therefore, they are 'first and foremost ... entrepreneurs trying to make a successful living by providing a service' (Higson, 1997: 203). As noted by Ramírez (2001), sole proprietorships become instrumental organisational forms in the earliest stages of the audit profession, suggesting that individuals applying for an audit licence usually intend to become sole practitioners or partners in an auditing firm (Dillard and Ferris, 1989: 224). In turn, this implies that they are putting their personal wealth and human capital at stake (DeAngelo, 1981: 25).

In this study, we focus on the relationship between certain individual characteristics of newly certified auditors, such as education, age, and job stability, and their decision to become business owner-managers in the audit market during the period 1976–1988. Lafuente and Salas (1989: 18) showed that the personal characteristics of business owner-managers '... are relevant factors in the study of entrepreneurship, because they will lie behind the supply side of entrepreneurial activities and will have to be closely identified in any public policy oriented to promote such activities.' Consequently, our study focuses on the individual auditor as a unit of analysis. In this manner, this investigation adds to prior research embracing a macro-perspective on the emergence and evolution of the audit profession in continental European countries and, therefore, focuses on professional associations or the profession at large (e.g. Belgium: De Beelde, 2002; Czech Republic: Seal et al., 1996; France: Ramírez, 2001; Germany: Evans and Honold, 2007; Greece: Caramanis, 2002). On rare occasions, these studies surveyed the opinions of auditors and financial executives to outline the impact of liberalisation reforms on auditor behaviour (Caramanis, 1998). As noted by Bröcheler et al. (2004), individual auditors are the most significant asset in the audit market and, therefore, it is apposite to examine the individual characteristics of those engaging in public practice vis-à-vis their counterparts breaking from the pro-

fession immediately after earning the necessary credentials.

Our examination of the individual traits of newly certified auditors draws on an integration of human capital theory and the entrepreneurship literature. The theory of human capital has highlighted some of the individual determinants of entrepreneurship (e.g. Carr, 1996), such as the effects of the founder's human capital on organisational performance, including the case of auditing firms (e.g. Preisendörfer and Voss, 1990; Pennings et al., 1998; Bröcheler et al., 2004). A basic tenet of human capital theory is that individuals spend time and money on themselves for the sake of future pecuniary and non-pecuniary returns (Blaug, 1976), thereby increasing their specific or general human capital (Becker, 1975). General human capital refers to the acquisition of comprehensive formal education and training, such as a university degree that is relatively transferable across firms and industries. Conversely, specific human capital strengthens an individual's knowledge about the idiosyncratic routines and procedures utilised in a particular firm. This is less easily transferred. For those who apply for an auditing licence, the auditing certificate constitutes a prerequisite for establishing their own business or becoming a partner in an auditing firm. In contrast, for those uninterested in public practice, the auditing certificate represents a professional qualification that could arguably expand labour market opportunities (Bullen and Flamholtz, 1985). Considering the highly fragmented nature of the audit market (Dillard and Ferris, 1989; Ramírez, 2001), we deem that the integration of the human capital and entrepreneurship frameworks is relevant in explaining some specificities of the auditing profession. Ultimately, this may be helpful in laying the groundwork for future research in this area.

2. The setting

2.1. Legislative reform

The 1951 Companies Act established the antecedents of the auditing function in Spain. Inspired by French legislation (Ramírez, 2001: 407), the Act required the appointment of shareholders (the so-called *accionistas-censores*) to investigate a firm's financial statements. As noted by Cubillo Valverde (1990: 303): 'As far as auditing is concerned, the 1951 Act was unfortunate. Instead of entrusting such a relevant function ... to the experts [the members of the ICJCE], the Act attributed to shareholders the role of auditors.' In this context, external audits were demanded in the case of conflict and audits performed by shareholders actually resulted in an exercise of 'fictitious auditing' (García-Benau et al., 1998: 89–90).

As this legal initiative brought about widespread dissatisfaction among qualified auditors (ICJCE, 1951, 1957, 1960), some legislative reforms further enforced auditing provisions (Pacheco, 2000). As far as firms listed on the stock market were concerned, the Decreto–Ley 7/1964 and its accompanying legislation established some requirements for mandatory audits. Notwithstanding this legislation, disputes around the meaning of an audit (Pont Mestres, 1991; García-Benau et al., 1998) as well as the qualifications of those engaging in public practice resulted in a marginalised audit function.

In 1986, Spain joined the European Economic Community and this involved further legislative reforms in the accounting and auditing domain, which the regulatory bodies had been trying to anticipate since 1979 (Bougen and Vázquez, 1997: 3). The creation of two new associations of auditors[2] in the early 1980s brought to an end the monopoly of ICJCE members in the provision of auditing services. Importantly for our purpose, no major attempt was made to develop a cohesive and credible infrastructure and the resulting situation featured 'division and struggle' (Cea García, 1992: 349). As in Greece (Dedoulis and Caramanis, 2007: 16), using the notion of 'profession' to refer to the auditing practice in Spain during this period would be contentious. The process of legislative reforms concluded with the passing of the Audit Law in 1988.

2.2. The economy

During the military dictatorship of General Franco, the Spanish economy operated under the principles of state intervention and autarchy (Carrera et al., 2001). In this context, the state set the prices of a considerable number of goods (e.g. bread and sugar), thereby neglecting the role of market forces. Furthermore, state-owned enterprises exerted an imposing role on sectors ranging from banking to hospitality through to manufacturing.

The Spanish government enforced stiff reforms to make the country conform to the principles of a free economy. Such reforms paid off. According to the World Bank, Spanish gross domestic product increased by an average rate of 3.7% during 1976–1988, compared with 2.5% in the US and 2.8% in the UK. In a related vein, Spanish exports increased by an average rate of 6.0% during that period, the outflows of foreign direct investments grew by 14.0%, and the inflows of direct foreign investments increased from an average of ESP 979.6bn during 1978–1986 to ESP 2,263.3bn during 1986–1989 (Bajo-Rubio and Sosvilla-Rivero, 1994). In short, this booming of the Spanish

[2] The two new associations of auditors were the Registro de Economistas-Auditores (REA, Register of Economists-Auditors) and the Registro General de Auditores (REGA, General Register of Auditors).

economy resulted in the Madrid Stock Market becoming the most profitable one in Europe in 1985 and 1986.

2.3. The audit market

Some international audit firms have operated in Spain since the 1920s (Carrera et al., 2001). However, most of the big audit firms started operations during the 1960s amid the enforcement of certain mandatory audit requirements for firms listed on the stock market (Decreto–Ley 7/1964). For example, Deloitte, Plender, Haskins & Sells started operations in Madrid in 1964 (Stevens, 1981). In the case of Price Waterhouse, Jones (1995: 283) noted: 'In nations, such as Italy and Spain, where the national accountancy profession remained embryonic, Price Waterhouse made the greatest progress. It built up a strong local client base and recruited and trained members of the indigenous population as professional staff and partners, supported by expatriates.' Finally, some other audit corporations established strategic alliances with domestic firms; in 1963, *Hispano Suiza de Revisión* was founded to insource audit work from audit multinationals. In the 1970s, *Revisión* signalled its partnership with Coopers & Lybrand, S.A. by changing its brand to *Revispana y Coopers & Lybrand, S.A.*

At the beginning of our observation period, the Big Eight firms operated in Spain. Furthermore, such firms usually employed ICJCE members. Our searches in the ICJCE's archives reveal that Price Waterhouse employed 89 members of the ICJCE; Arthur Andersen, 60; Peat Marwick Mitchell, 24; Ernst and Whinney, 19; Touche and Ross, 90; and Binder Dijker Otte & Co., 4.

The demand for audit services increased in Spain from the start of our observation period. For example, the number of listed firms audited by members of the ICJCE increased dramatically between 1974 and 1976, from 401 to 698 firms (74%). In a related vein, the number of requests for ICJCE members to offer their professional services in litigation increased from 60 to 111 between 1974 and 1976. The annual reports of the ICJCE also indicated continued expansion in audits for non-listed firms, state-owned enterprises, chambers of commerce, and regional authorities. Because of the increasing demand for audit services, the number of certified auditors doubled during our observation period.

For 'unlicensed auditors', that is, individuals breaking from the profession at the time of earning the necessary credentials, our search in the ICJCE's archives for the period under investigation shows that 44% (354 individuals) worked for the public sector: at different ministries (31.5%, 253 individuals), state-owned enterprises (7.5%, 60 individuals), and universities (5%, 41 individuals). The remaining 56% of 'unlicensed auditors' worked for the private sector: 23.6% (190 individuals) at consultancy and audit firms, 7.5% (60 individuals) in the financial sector, and 24.4% (196 individuals) in sundry industries.

2.4. Education

Spanish higher education institutions were traditionally populated by the wealthy as well as by those living in cities that host a university centre (e.g. Madrid, Barcelona, Salamanca, and Santiago; see Vila and Mora, 1998). The advent of the Spanish democracy changed this situation; in the case of degrees in economics and business administration, the number of university centres increased from 15 in 1976 to 23 in 1988 (Gutiérrez and Ortega, 2007) and, hence, made such studies accessible to students lacking the necessary funding to pay for board and lodging outside their homes.

Spain has a number of different levels of university education. In the period 1976–1988, the Spanish higher education system offered three types of programmes: (i) short-cycle programmes, comprising three-year university degrees; (ii) long-cycle programmes, typically five-year university degrees, although the length of these programmes increases to six years for engineering and medical degrees; and (iii) postgraduate degrees, such as doctorates, implying a long-cycle education programme as a prerequisite, and consisting of doctoral courses plus the delivery of a doctoral thesis. Doctoral programmes targeted individuals aiming for a university career (Vila and Mora, 1998: 173). Expansion in the number of university centres during our observation period brought about significant increases in the number of individuals earning three-year university degrees (e.g. 1,734 individuals in 1978–1979 and 4,081 individuals in 1987–1988) and, to a much larger extent, five-year university degrees (e.g. 1,488 individuals in 1978–1979 and 7,088 individuals in 1987–1988; see Anuario INE, 1979, 1988). In terms of social reputation, six-year degrees in medicine, architecture, and engineering are still highly regarded by Spanish society (Vila and Mora, 1998).

2.5. The public sector

The Spanish public sector experienced dramatic changes following the advent of democracy in 1976. As a consequence of the legislative reforms that followed the approval of the Spanish Constitution of 1978, the public sector steadily changed its focus from being an instrument of General Franco's dictatorship to providing service to the citizens (García de Enterría, 2007). In turn, this involved changes in societal understandings of accountability. Whilst General Franco and his regime were only 'accountable before God and

history' (De la Cierva, 1973), the President of the National Jury (Audiencia Nacional) said in 1981: 'Those entrusted to manage the goods of others – either public or private – should render accounts of their activities' (quoted in Valverdú Calafell, 1984: 104). Such ideas, which were common in Western democracies, involved a complete reshuffle of the Internal Auditing Agency of the Public Sector in 1982 (IAAPS, *Tribunal de Cuentas del Reino*), and this enhanced the expectations of those willing to pursue an auditing career within the public sector.

3. Hypotheses

3.1. General human capital

Individuals with high levels of general human capital are expected to be more efficient in their jobs and enjoy a considerably greater number of labour market opportunities (Becker, 1962). Conversely, individuals with low levels of general human capital are regarded as less efficient in the workplace and are more likely to face spells of unemployment (Blaug, 1976). Accordingly, individuals who aim to increase their general human capital are prone to sacrifice current returns because of the expectation of higher future earnings (Mincer, 1962; Blaug, 1970). In view of such internal and external opportunities, these individuals are regarded as less likely than their counterparts to change their occupational status through self-employment (Blanchflower and Oswald, 1998). Taken together, these results clearly reflect the decision to become an owner-manager as the default career choice.

Given the nature of the audit market (a professional services market), human capital can help explain the success or failure of auditing firms (Bröcheler et al., 2004). Auditors with a high level of educational attainment are expected to deliver consistent and high-quality services inside their firms (Pennings et al., 1998; Bröcheler et al., 2004). Several studies provided evidence on the relationship between general human capital and important characteristics of the audit market, such as the performance of auditing firms and the impact of human resources policies.[3] Hunton and Wier (1996), for example, investigated the promotion of accountants working for private firms and found that attainment of education and professional certification – that is, general human capital – exerted a significant, positive influence on the time-to-promotion decision.[4] Moreover, Hunton and Wier (1996) found that professionally certified accountants were promoted more quickly than their non-certified counterparts.

These insights are relevant in understanding the characteristics of entrepreneurial activity in Spain. As a consequence of the highly interventionist economic model under Franco's dictatorship, not until the 1980s did an entrepreneurial culture begin to take root. Studies showed that Spanish entrepreneurs engage in entrepreneurial activities only through necessity, and seldom see such activities as an opportunity (Reynolds et al., 2001: 94). In other words, Spanish individuals perceive the decision to start a new business as the default career choice (Coduras et al., 2003: 34). This leads us to hypothesise:

H1: General human capital is negatively associated with the likelihood of newly certified Spanish auditors becoming licensed auditors.

3.2. Specific human capital

Mincer (1962) conceptualised specific training as an investment that increases the marginal product of those who invest in it by improving an individual's knowledge of workplace routines and procedures. As noted by Becker (1975), the idiosyncratic nature of specific human capital makes its transfer across organisations difficult. Individuals who acquire specific human capital engage in within-firm training programmes and have on-the-job experiences that increase their expectations of promotion and tenure, thereby providing little incentive for leaving the firm (Capelli and Cascio, 1991; Mincer, 1993).

Auditing firms face high levels of employee turnover, which affects their efficiency (Rhode et al., 1977; Rasch and Harrell, 1990). To curb this problem, auditing firms deploy internal, extensive, and compulsory training programmes that increase the expertise of their employees in a firm's routines and procedures, and ultimately result in the enhancement of specific human capital (Pennings et al., 1998). These training programmes are often regarded as part of a general programme of socialisation for individuals into the organisational culture, and therefore, 'they are first and foremost a commitment to an individual firm.' (Anderson-Gough et al., 1998: 3; 2002). Specific human capital helps to produce high-quality auditing services and decreases employee turnover as well as the likelihood of becoming self-employed in the auditing market (Robson et al., 1996; Lane and Parkin, 1998).

The Spanish audit market featured high uncertainty during our observation period. Despite prospects of growing demand for audits, several accounting scandals (e.g. in 1983, Explosivos Río Tinto) and a continuous conflict among auditors brought about societal and legal understandings of

[3] Given the dearth of studies on the impact of human capital on promotion within Spanish audit firms, we rely on international evidence, especially from the US and the UK.

[4] For example, accountants with a postgraduate education experienced faster promotion than those with a bachelor's degree alone (Hunton and Wier, 1996).

the audit function as an 'activity' instead of a 'profession' (Carrera, 2003). Furthermore, the future of auditing was highly dependent on the passing of specific regulation by the Spanish Parliament. Arguably, newly certified auditors with high specific human capital experienced conflicts between opportunities arising from the expected, growing demand for audit services and high uncertainty about the future of the profession. Under conflicting circumstances such as those featured by the Spanish audit market, Hofstede (1997) suggested that individuals draw heavily on their national culture to make decisions. In this respect, Spain scored highly (90) in Hofstede's index for uncertainty avoidance, that is, the Spanish society did not have tolerance for ambiguity and uncertainty (e.g. for comparison purposes, the UK scored 40 in this metric). Consequently, newly certified Spanish auditors with high specific human capital would have leaned towards pursuing their careers in their current firms and, hence, refrained from engaging in entrepreneurial activities that would have involved financial investments, high risks and high market uncertainty. Thus, we make the following hypothesis:

H2: Specific human capital is negatively associated with the likelihood of newly certified Spanish auditors becoming licensed auditors.

3.3. Age

The entrepreneurship literature contends that self-employment decisions are contingent on the age of the individual (Casson, 1982). Arguably, young people lack the experience, skills, and material resources to ensure successful entry into the entrepreneurial market (Blanchflower et al., 2001) and may use the auditing certificate as a formal endorsement of their professional qualifications. Therefore, it is expected that the decision to become an owner-manager is more likely to be made by older individuals (Carr, 1996; Blanchflower et al., 2001). Furthermore, individuals close to retirement tend to be risk-averse (Bates, 1990), suggesting they are reluctant to leave salaried work for the uncertainties of self-employment (Hachen, 1990). Legal and financial risks inherent in the auditing profession (Simunic and Stein, 1996; Dalton et al., 1997) add to the usual uncertainties of entrepreneurship. At the same time, the expectations of financial returns for older, newly certified auditors are lower because they are restricted to the remaining short period until retirement. Conversely, middle-aged individuals have accumulated work experience, knowledge of the market, and professional reputation (Knight, 1921; Brüderl et al., 1992). Furthermore, they can expect the returns from their entrepreneurial efforts over a relatively longer period before retirement. In addition, the middle-aged auditor is likely to have sufficient material resources to establish a new business and to tackle its concomitant financial and legal risks. Arguably, middle-aged, newly certified auditors are more likely than their younger and older counterparts to apply immediately for an audit licence and to become business owner-managers, either on their own or with a partner or partners.

In the case of Spain, Carrasco (1999) examined the transitions to and from self-employment by drawing on data gathered from an extensive database, the Spanish Continuous Family Expenditure Survey (*Encuesta de Población Activa*, ECPF) for the period 1985–1991. Carrasco (1999) focused on entrants into self-employment from wage earners and unemployed individuals and found that middle-aged individuals (35–55 years old) accounted for the majority of entrants in both situations, 57.71% and 51.46% respectively. Interestingly also, young individuals had a higher propensity to go entrepreneurial from wage-earning positions (27.82%) than from unemployment (17.39%). In the latter case, they probably lacked the necessary financial resources (Carrasco, 1999: 341). Taken together, this reasoning leads us to make the following hypothesis:

H3: Age has an inverted U-shaped relationship with the likelihood of newly certified Spanish auditors becoming licensed auditors.

3.4. Switching costs: job stability

The chances of starting a new business are negatively related to the costs of leaving an employment situation (Gimeno et al., 1997). Newly certified auditors assess their switching costs by comparing their current occupational status with the eventual ownership of a firm in the auditing market. The latter involves risks arising from client and third-party liability (e.g. Simunic and Stein, 1996; Dalton et al., 1997; Johnstone, 2000). People working in positions characterised by a high degree of stability, security, and insulation from external competition may consider this risk as being too high (Hachen, 1990).

Public sector employees provide a particularly strong example of switching costs because they enjoy long-term stability, regular salary, predictability, and an internal system of promotion (Hinchliffe, 1987). This is evidenced by low employee turnover in public sector jobs (Hachen, 1990). In Spain, the employment conditions of civil servants (*funcionarios*) are such that public sector employees enjoy high social status (García-Pérez and Jimeno, 2006). Consequently, Spain is one country where '... there are typically several hundred, even thousands, of applicants for each vacancy in the public sector, while some occupations in the private sector find it difficult to hire new employees' (García-Pérez and Jimeno, 2006: 10).

This is particularly appropriate in describing the behaviour of certified auditors in Spain, a country whose nationals have a high level of risk aversion (Coduras et al., 2003) and uncertainty avoidance (Hofstede, 1997). As noted by some commentators, this makes individuals prefer a stable income in public sector-related activities rather than an uncertain, albeit potentially higher, income from self-employment (Reynolds et al., 2001). For Spanish individuals therefore, 'there remains a strong preference for stable income in a state-owned company or in the public sector' (Reynolds et al., 2001: 40). During our observation period, public sector employees enjoyed stable income and a high social appreciation, which made it difficult for them to go entrepreneurial through applying for an auditing licence, especially in view of career prospects within the public sector as a consequence of the reshuffle of the IAAPS (Valverdú Calafell, 1984). Therefore, we would expect newly certified auditors in stable jobs, such as the public sector, to use their auditing certificate to enhance their chances of promotion within the public sector, rather than taking the high risk and high uncertainty route of applying for an auditing licence and becoming owner-managers in the audit market. Thus, we make the following hypothesis:

H4: Newly certified Spanish auditors with high switching costs from their present occupation have a lower likelihood of becoming licensed auditors.

4. Data source, variables and methods

4.1. Data source

Our research is based on information gathered from the archives of the ICJCE concerning their licensed and unlicensed members. The ICJCE's directories contain information about members' names, addresses, and dates of admission to the ICJCE, as well as their educational background, occupational status, previous positions, and eventual application for an auditing licence at the time of entry to the ICJCE. Our data are based on 2,633 individuals with completed entries who earned an auditing certificate between 1976 and 1988. Of these, 1,931 (73.34%) registered as licensed auditors at the time of joining the ICJCE, and 702 (26.66%) did not apply for an auditing licence (unlicensed auditors).[5]

4.2. Methods

We use logistic regression to model the likelihood of newly certified auditors becoming licensed auditors (Hosmer and Lemeshow, 1989). In auditing research, Dalton et al. (1997) used this model to examine the decision regarding the eventual withdrawal of a firm's partner to avoid litigation risks. What distinguishes a logistic regression model from a linear regression model is that the outcome variable (in our case, 'licensed auditors') is dichotomous. That is, the variable takes a value of 1 if the individual is a 'licensed auditor' and 0 if the individual is an 'unlicensed auditor'. Logistic regression models permit us to estimate the probability of an individual applying for an audit licence. Therefore, the probability of becoming a licensed auditor is:

$$(1)\quad \Pi(X) = \frac{e^{g(X)}}{1 + e^{g(X)}},$$

where

$g(X) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p$,

$\Pi(X)$ = probability (licensed auditor),
β_0 is the estimated constant,
β_1 through to β_p are the estimated coefficients, and
χ_1 through to χ_p are the independent variables.

The estimated coefficients for the independent variables represent the slope or rate of change of the logit function of the dependent variable ('licensed auditors') per unit change in the independent variable. The interpretation of each coefficient relates directly to the definition and meaning of a one unit of change in the independent variable.[6]

4.3. Operationalisation of variables

Audit licence

As previously stated, the dependent variable *Audit licence* depicts the decision of the newly certified auditor to apply for an auditing licence and become a licensed auditor. This dichotomous variable was coded 1 = licensed auditor and 0 = unlicensed auditor. This categorisation is similar to the studies in the review by Amemiya (1981) of individual choices among labour market opportunities.

Education

Both human capital theory and the auditing literature used years of education and education level as proxies for general human capital (e.g. Carroll and Mosakowski, 1987; Carr, 1996; Hunton and Wier, 1996; Pennings et al., 1998). To categorise the variable *Education*, we need to consider both the entry requirements of the profession and the characteristics of the Spanish university system. In our sample, all individuals are certified auditors and, hence, hold a university degree or equivalent.

[5] The search in the ICJCE's archives located 802 unlicensed auditors for the period under investigation. One hundred observations were excluded from the analyses because of missing data.

[6] The intercept coefficient may also be of interest (Hosmer and Lemeshow, 1989). In our case, the intercept coefficient captures some factors affecting the probability of becoming a licensed auditor unmeasured by the variables included in the model.

Accordingly, we categorise the *Education* variable as follows: 1 = a three-year university degree; 2 = a five-year university degree; and 3 = a postgraduate degree (e.g. PhD).

Big firms

Large organisations are often characterised by considerable distances between units and employees. This brings about potential problems with standardising products and services, as well as maintaining internal cohesion. Consequently, large firms seek to acquaint their employees with routines and procedures, providing them with expansive in-house training programmes (Alba-Ramírez, 1994). Large auditing firms provide their employees with more structured training to help enhance their competency and expertise in performing audits (Chia, 2003: 104). Empirical evidence on the training programmes of large auditing firms reveals a complex web of formal and informal rules that must be learned by individuals working for these organisations (Anderson-Gough et al., 1998; Grey, 1998; Pennings et al., 1998). However, the routines of small accounting firms are not as formally established, and employees acquire these through significant on-the-job exposure (Humphrey et al., 2006). In sum, auditors working for leading domestic or international auditing firms are expected to gain more specific human capital than their counterparts in smaller firms.

The *Big firms* variable was created to identify individuals working for large auditing firms at the time of affiliation with the ICJCE. This variable was coded 1 = individual worked for a leading domestic or international auditing firm at the time of joining the ICJCE, and 0 = individual did not work for such a firm.

Age

This variable is regularly employed in both the human capital and entrepreneurship literature (Becker, 1975; Rhode et al., 1977; Evans and Leighton, 1989; Carr, 1996). We employ a continuous variable to measure the individual's age in years at the time of joining the ICJCE. We hypothesise a quadratic or U-shaped relationship between the individual's age and the likelihood of engaging in auditing practice. Both the variable *Age* and its square value (*AgeSQ*) are included to capture any non-linearity in the relationship (Hosmer and Lemeshow, 1989: 95).

Public sector

We used the dichotomy between the 'public sector' and the 'private sector' as a proxy for stability and security. In this respect, our dichotomous variable, *Public sector*, is coded 1 = individual was working in the public sector at the time of joining the ICJCE, and 0 = individual did not work in the public sector.

Control variables

Previous research shows gender differences in the Spanish auditing market (Carrera, 2003). In fact, women were barred from the auditing profession by the ICJCE until 1976. Although the number of women in the ICJCE has increased every year since 1976, the number of men joining the ICJCE has remained significantly higher, ensuring that auditing remains a male-dominated profession (Carrera et al., 2001). Research on self-employment decisions show that women's decisions differ from men's: women, for instance, place greater emphasis on their families when making the entrepreneurial decision (Carr, 1996; Blanchflower and Oswald, 1998). Thus, we created a *Gender* variable, coded 1 = female and 0 = male.

The supply of auditing services depends on the number of auditors in the market (Pennings et al., 1998). In the case of the Spanish auditing market, auditor density is largely contingent on geographical distribution. The provinces of Madrid, Barcelona, Seville, Valencia, and Biscay reported the highest density of auditors during our observation period. Thus, we create the variable *Market density* to identify the province in which auditors established their offices and offered their professional services: 1 = individual established in Madrid, Barcelona, Seville, Valencia, or Biscay; and 0 = individual established elsewhere.

We argue that the decision to become a licensed auditor may also be influenced by contextual factors, such as expected changes and actual enforcement of auditing regulations, as well as by the general economic situation. Therefore, the moment an individual is granted an auditing certificate may constitute a relevant variable for explaining the likelihood of applying for an auditing licence. We created the variable *Year of qualification* as an indicator of the time the individual joined the ICJCE, establishing four subperiods in an attempt to capture significant changes in the Spanish auditing profession. First, we consider the period 1976–1979, which is characterised by a monopoly of ICJCE members in the provision of auditing services to firms established in Spain. Second, the period 1980–1983 witnessed the removal of this monopoly and the emergence of other professional associations (i.e. *Registro de Economistas Auditores* (REA)). Third, the period 1984–1987 is characterised by the actual challenge from auditors of other professional associations to ICJCE's members. Finally, we considered 1988 as the year when the Spanish Audit Law was discussed and passed in the Spanish parliament.

5. Descriptive analysis and results

5.1. Descriptive analysis

We conducted a preliminary analysis of the relationship between the dependent and independent

variables. The univariate analysis revealed some degree of association between the variables included in our model and the probability of applying for an auditing licence. Table 1 presents the basic descriptive statistics and the correlation matrix for the variables included in the model. As shown in Table 1, the arithmetic means indicate that licensed auditors have a lower education level and are older than unlicensed auditors, and that the latter are more likely to work for the public sector. The correlation matrix shows that there are many significant correlations. However, these are of such a low magnitude that the potential for collinearity in our model is limited.

Table 2 describes the categorical variables included in the model (*Education*, *Big firms*, *Public sector*, *Market density*, and *Gender*). Data for the variable *Education* show that the highest percentage of licensed auditors is among those holding a three-year university degree (633 of 724 individuals or 87% are licensed auditors). For certified auditors with a five-year university degree, this percentage drops to 68% (1,242 of 1,817 individuals). In the case of the variable *Big firms*, we found that 308 individuals of the 491 working for large auditing firms are licensed auditors (approximately 63%). For those who do not work for large auditing firms, the percentage is higher (about 80%). The percentage of licensed auditors among those working for the public sector is around 50% (277 of 554 certified auditors). In relation to the control variable *Market density*, Table 2 shows that 71% of individuals in provinces with a high density of auditors applied for an audit licence. For the variable *Gender*, the sample indicates that approximately 66% of women and 74% of men are licensed auditors. Lastly, the number of individuals becoming certified auditors diminished over the years (see *Year*); this is mainly because of the decline in the number of licensed auditors and, we argue, a decline in market growth. While in the cohort of 1976–1979, the proportion of individuals obtaining an audit licence was 81.7% (770 of 943 individuals), in 1988 the percentage dropped to 71% (485 of 684 individuals). The variable *Age* was included in the model as a continuous variable and its basic statistics are also reported in Table 1.

5.2. *Results*

Model 1 in Table 3 shows the results of the multivariate logistic regression model for H1–H4. All variables other than *Gender* and the constant are significant at $\alpha = 0.01$. The Hosmer–Lemeshow goodness-of-fit test indicates that the model is well suited to the data.

H1 states that the likelihood of newly certified auditors becoming licensed auditors is negatively associated with the level of general human capital. We would have support for this contention if the coefficients of the *Five-year university degree* and *Post-graduate degree (master's degree or doctorate)* variables were negative and significant. Model 1 in Table 3 reveals that both *Five-year university degree* and *Post-graduate degree (master's degree or doctorate)* variables have negative (–0.724 and –0.758, respectively) and significant ($\alpha = 0.01$) coefficients. The estimated coefficients indicate that a change in the level of education (a higher education level than that existing in the control group *Three-year university degree*) has a negative impact on the likelihood of obtaining an audit licence. This finding indicates *ceteris paribus* that newly certified auditors with high general human capital were less likely to apply for an auditing licence and become business owner-managers in the audit market than their counterparts.

H2 contends that the likelihood of newly certified auditors becoming licensed auditors is negatively associated with their level of specific human capital. There is support for H2 if the coefficient of the *Big firms* variable is negative and significant. Model 1 reveals that the coefficient for *Big firms* is negative (–0.884) and significant ($\alpha = 0.01$). Consequently, this finding indicates that newly certified auditors with high levels of specific human capital were less likely to apply for an auditing licence and become licensed auditors than their counterparts. All other things being equal, newly certified auditors who had been exposed to on-the-job training programmes in their firm (e.g. a large auditing firm) were less likely to apply for an auditing licence and become business owner-managers through self-employment than their counterparts (e.g. those employed by small to medium-sized auditing firms).

H3 investigates the relationship between age and the likelihood of applying for an audit licence. H3 predicts that the decision of a newly certified auditor to become a licensed auditor exhibits an inverted U-shaped relationship with age. Our results show that both *Age* and *AgeSQ* are significant ($\alpha = 0.01$), and suggest a concave relationship between age and the likelihood of applying for an audit licence to become a business owner-manager in the audit market. This finding is reinforced by the results of the estimated odds ratios for *Age*, as derived from Model 1.[7] Figure 2 shows the adjusted odds ratios for *Age* and illustrates the differences in the likelihood of becoming a licensed auditor for individuals of different ages, with the propen-

[7] We use the odds ratios because they provide a straightforward comparison of the likelihood of the event of becoming a licensed auditor among individuals of different ages (Hosmer and Lemeshow, 1989). Furthermore, we calculate the adjusted odds ratios instead of the adjusted estimated probabilities to avoid the eventual confounding effects of other variables included in our model.

Table 1
Means, standard deviations (SDs), and correlations (*p* value)

	Licensed auditors		Unlicensed auditors									
Variable	**Mean**	**SD**	**Mean**	**SD**	*Audit licence*	*Education*	*Big firms*	*Age*	*Public sector*	*Gender*	*Market density*	*Year of qualification*
Education	1.70	0.52	1.92	0.42	–0.195 (0.000)	1.000 –						
Big firms	0.16	0.37	0.26	0.44	–0.111 (0.000)	0.138 (0.000)	1.000 –					
Age	34.46	6.88	33.88	8.16	0.024 (0.226)	–0.230 (0.000)	–0.218 (0.000)	1.000 –				
Public sector	0.14	0.35	0.39	0.49	–0.273 (0.000)	0.180 (0.000)	–0.247 (0.000)	0.141 (0.000)	1.000 –			
Gender	0.072	0.26	0.10	0.30	–0.048 (0.014)	0.094 (0.000)	0.040 (0.040)	–0.164 (0.000)	0.074 (0.000)	1.000 –		
Market density	0.71	0.46	0.78	0.41	–0.074 (0.000)	0.091 (0.000)	0.183 (0.000)	–0.050 (0.010)	–0.058 (0.003)	0.026 (0.182)	1.000 –	
Year of qualification	2.18	1.20	2.44	1.14	–0.097 (0.000)	0.254 (0.000)	0.256 (0.000)	–0.091 (0.000)	–0.026 (0.175)	0.174 (0.000)	–0.026 (0.183)	1.000 –

Table 2
Descriptive statistics for categorical variables

Variables	*Unlicensed auditors* N = 702 (26.66%)	*Licensed auditors* N = 1,931 (73.34%)	*Total* N = 2,633 (100%)
Education			
Three-year university degree	91 (3.46%)	633 (24.04%)	724 (27.50%)
Five-year university degree	575 (21.84%)	1242 (47.17%)	1817 (69.01%)
Postgraduate degree (master's degree or doctorate)	36 (1.37%)	56 (2.13%)	92 (3.49%)
Big firms			
No	519 (19.71%)	1,623 (61.64%)	2,142 (81.35%)
Yes	183 (6.95%)	308 (11.70%)	491 (18.65%)
Public sector			
No	425 (16.14%)	1,654 (62.82%)	2,079 (78.96%)
Yes	277 (10.52%)	277 (10.52%)	554 (21.04%)
Market density			
High density: Madrid, Barcelona, Seville, Valencia, and Biscay	550 (20.89%)	1,363 (51.77%)	1,913 (27.34%)
Other	152 (5.77%)	568 (21.57%)	720 (27.34%)
Gender			
Male	630 (23.93%)	1,792 (68.06%)	2,422 (91.99%)
Female	72 (2.73%)	139 (5.28%)	211 (8.01%)
Year of qualification			
1976–1979	173 (6.57%)	770 (29.24%)	943 (35.81%)
1980–1983	244 (9.27%)	527 (20.02%)	771 (29.28%)
1984–1987*	86 (3.27%)	149 (5.66%)	235 (8.93%)
1988	199 (7.56%)	485 (18.42%)	684 (25.98%)

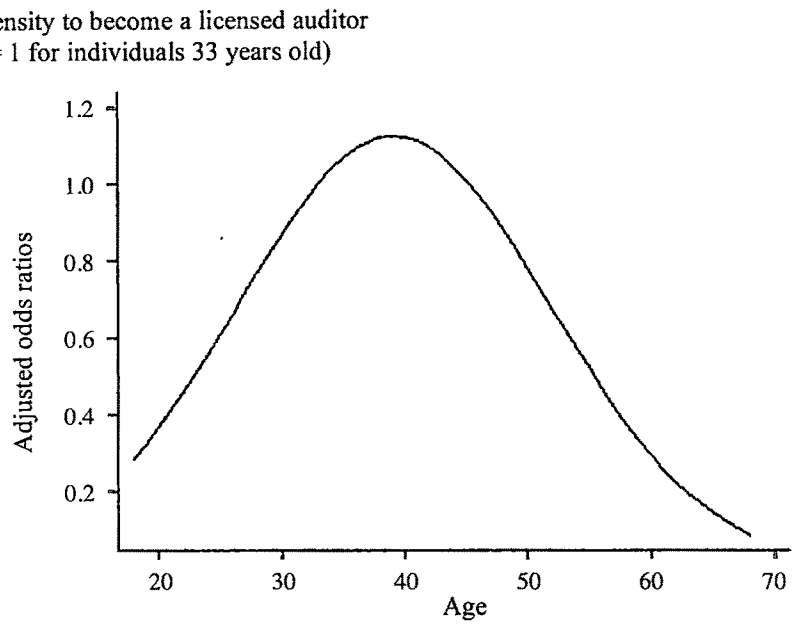
*There were no new auditors in our sample in 1986 and 1987.

Table 3
Logit analysis results to test for differences between licensed auditors and unlicensed auditors

Variable	*Model 1 (Main effects) Coefficient*	*Model 2 (Main effects and interaction) Coefficient*
Constant	–1.631**	–0.678
	(0.964)	(1.013)
Education		
Five-year university degree	–0.724*	–0.752*
	(0.139)	(0.139)
Postgraduate degree	–0.758*	–0.771*
(master's degree or doctorate)	(0.262)	(0.300)
Big firms	–0.884*	–3.522*
	(0.135)	(0.743)
Age	0.241*	0.199*
	(0.050)	(0.052)
AgeSQ	–0.003*	–0.003*
	(0.001)	(0.001)
Public sector	–1.634*	–1.601*
	(0.118)	(0.118)
Gender	0.010	0.099
	(0.170)	(0.171)
Market density	–0.338*	–0.340*
	(0.117)	(0.117)
Year of qualification		
1980–1983	–0.768*	–0.778*
	(0.126)	(0.126)
1984–1987	–0.498*	–0.747*
	(0.186)	(0.200)
1988	–0.386*	–0.380*
	(0.135)	(0.136)
Age × Big firms		0.087*
		(0.024)
Pseudo R^2	0.13	0.14
Log L	–1,325.52	–1,318.07
LR Chi^2 (10)	402.52	417.43
$p > Chi^2$	0.000	0.000

Standard errors are in parentheses
* $p = 0.01$ (two-tailed test)
** $p = 0.10$

Figure 2
Propensity to become a licensed auditor by age (adjusted odds ratios)



sity of individuals 33 years old being equal to one.

Figure 2 shows that middle-aged, newly certified auditors were more likely to apply for an audit licence than their younger or older counterparts. Our results show that the likelihood of becoming a licensed auditor increases until individuals reach 38–39 years, at which point a negative relationship exists between age and the propensity to become a business owner-manager in the audit market. Furthermore, we compare the propensity of a 33-year-old certified auditor to become a business owner-manager in the audit market (propensity equal to 1) vis-à-vis their counterparts of other ages. Our results reveal that such a propensity was: (i) 0.6 among 25-year-old individuals, (ii) 1.12 for 39-year-olds, and (iii) 0.52 among 55-year-olds. In support of H3, our results indicate that younger and older newly certified Spanish auditors were less likely to apply for an audit licence and become business owner-managers.

H4 states that the likelihood of becoming a licensed auditor in Spain is negatively associated with the stability and security of the individual's job position at the time of becoming a certified auditor. Support for this contention requires the coefficient for *Public sector* to be significant and negative. Model 1 in Table 3 shows that the coefficient of the variable is negative (–1.634) and significant ($\alpha = 0.01$). *Ceteris paribus*, this indicates that newly certified auditors working for the Spanish public sector are less likely to apply for an audit licence than those working in the private sector. This suggests that the security and stability of the public sector jobs held by these individuals at the time of earning an audit certificate made them less likely to apply for an audit licence and become business owner-managers in the market for auditing services.[8]

With the exception of *Gender* and the intercept, the remaining control variables for both models are all significant at $\alpha = 0.01$ (see Model 1, Table 3). The coefficients for the dummies of the variable *Year of qualification* are negative, suggesting that the likelihood of becoming a licensed auditor in the Spanish auditing market was smaller during the 1980s (subperiods 1980–1983, 1984–1987, and 1988) in comparison with the first subperiod, 1976–1979. However, this negative impact is proportionally smaller over time, indicating that individuals are more likely to apply for an audit licence and become business owner-managers at the end of the period under investigation than previously. The political stability of the 1980s, the economic growth experienced by the country, and the expectations generated by the new regulations for the Spanish auditing market (e.g. the Audit

[8] A lack of skills and competence in managing an audit business constitutes an equally plausible explanation. We thank an anonymous referee for this insight.

Law was enacted in 1988) could partly explain this trend. Finally, the coefficient for *Market density* is significant and negative (see Model 1, Table 3). As expected, individuals were less likely to apply for an audit licence and become business owner-managers in the auditing market in regions with a higher number of potential competitors.

5.3. Additional analysis

One beneficial effect of specific human capital could be the increased likelihood of promotion into a partnership in an auditing firm, a position requiring a comprehensive knowledge of internal procedures and a commitment to the firm (Anderson-Gough et al., 1998). If the accumulation of specific human capital is not largely dependent on time and seniority (Becker, 1975), it would be difficult for auditing firms to provide intensive in-company training to employees while simultaneously delivering professional services to clients. Therefore, employees with greater seniority in auditing firms have arguably accumulated sufficient specific human capital to become eligible for promotion to partnership positions. In accountancy firms, a regular career from a junior accountant to a partnership position takes between 10 and 14 years (Robson et al., 1996; Expansión, 24 June 2004: 24). Promotion to a partnership position in these professional service firms makes an individual a business owner-manager. This produces a shift in their professional status.

Examination of the extent to which specific human capital is positively associated with the likelihood that newly certified auditors in Spain will apply for an audit licence to obtain promotion to a partnership position in an auditing firm requires the calculation of the joint effects of a newly certified auditor working for a large auditing firm and seniority. As the database does not contain data about the length of time that newly certified auditors had worked for the same firm, the *Age* variable is used as a proxy for seniority. Consequently, we measure the joint effects through the interaction term *Age* × *Big firms*, and support for our contention requires a positive, significant coefficient. We also expect a significant and negative coefficient for *Big firms*, as per Model 1. As the logistic regression shown in Model 1 does not adequately capture the interaction between variables, we estimate Model 2 (see Table 3). We find that both *Big firms* and *Age* × *Big firms* are significant ($\alpha = 0.01$). Furthermore, we find the expected signs for both coefficients: negative (–3.522) for *Big firms* and positive (0.087) for *Age* × *Big firms*. Arguably, the existing high correlation between this interaction term and *Big firms* (0.982) may generate multicollinearity and a loss of significance for some variables (Capelli and Cascio, 1991). However, the inclusion of this variable does not involve a loss of significance for the *Big firms* coefficient. The model remains well fitted to the data, as shown by the Hosmer–Lemeshow goodness-of-fit test. Our results indicate a positive relationship between the process of becoming a licensed auditor and employment with a large auditing firm when considering age at the time of joining the ICJCE. Finally, the remaining coefficients for both the independent and the control variables are similar to those shown in the model without the interaction parameters (Model 1).

We calculate the adjusted odds ratios to explore further the relationship between *Age* and *Big firms*. The adjusted odds ratios measure the likelihood of a newly certified auditor working for a large auditing firm becoming a licensed auditor (see Figure 3).

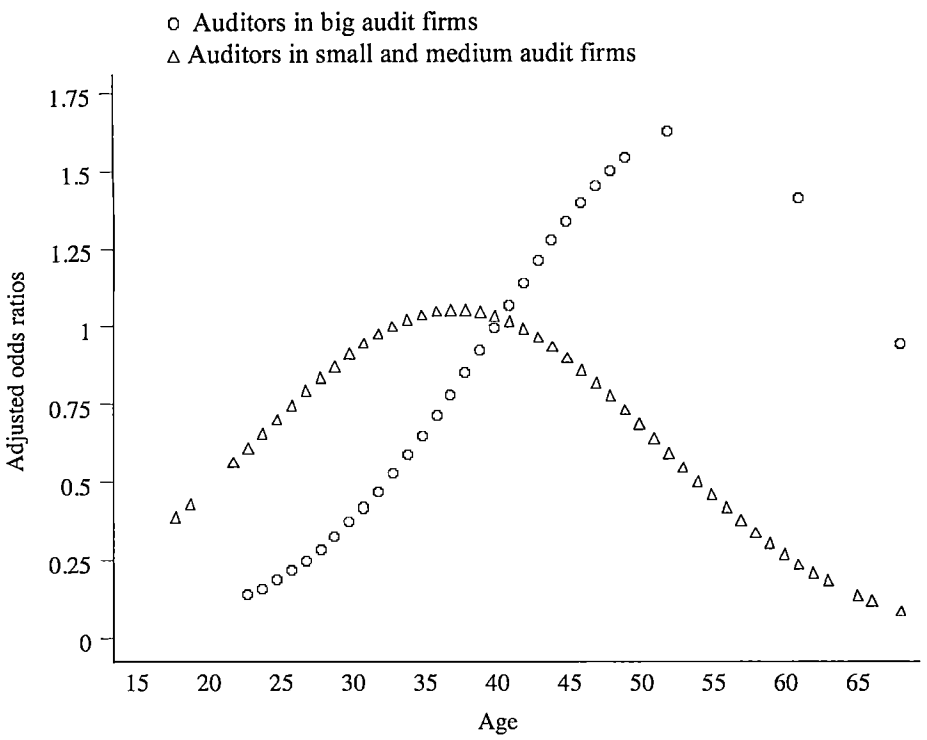
As shown in Figure 3, the adjusted odds ratios depict different patterns for each group of individuals. Newly certified auditors who did not work for a large auditing firm showed a declining likelihood of becoming business owner-managers between the ages of 40 and 45 years. After the age of 45 years, however, auditors working for large auditing firms were increasingly likely to obtain their auditing licences. For such individuals, this result is consistent with the relationship between age and promotion to partnership positions, which require the holding of an audit licence.

6. Discussion and conclusions

In this study, we focus on the characteristics of individuals joining the Spanish auditing profession during a relevant period of its history, namely, 1976–1988. This observation period had good prospects for auditors, because of market growth, and high uncertainty arising from the eventual consequences of a comprehensive reorganisation of the profession, ultimately enforced through state regulation. In this unique social laboratory, we examine the most significant asset in the audit market: human capital (Bröcheler et al., 2004). By focusing on the individual auditor as a unit of analysis, our study adds to prior research examining the emergence of the profession in continental European countries from a macro-perspective (e.g. professional associations or the profession at large; see Russia: Sucher and Bychkova, 2001; Slovakia: Daniel et al., 2001).

Our results indicate that Spanish newly certified auditors (i) with high general human capital, (ii) with high specific human capital, (iii) with stable jobs and (iv) at the beginning or end of their professional careers were less likely to apply for an audit licence than their counterparts with low general human capital, low specific human capital, unstable jobs, and who were middle-aged. According to human capital theory (Becker, 1975; Blaug,

Figure 3
Adjusted odds ratios for the variables *Age* and *Big firms*



1976), individuals with high human capital outperform their counterparts with lower human capital. Therefore, our results reveal that the decision of newly certified Spanish auditors to engage in public practice constituted a default career choice (Mincer, 1962; Blaug, 1970, 1976). Some distinctive features of our context may help explain these findings.

The marketability of professional certifications such as *Certified Public Accountant* (CPA) or *Chartered Accountant* (CA) may seem inarguable to an English-speaking audience. Nonetheless, we advise caution when considering the market value of the audit certification in other settings; Spain had no tradition in auditing and mandatory audits were not actually enforced until very recently. Good prospects for growth in the Spanish audit market did not outperform perceptions of high uncertainty arising from the upcoming reforms, which would determine the future of the audit function. Furthermore, the history of professional associations such as the ICJCE provided support for contentions about a failure in the 'professionalisation process' of auditing in Spain (Bougen and Vázquez, 1997). As noted by Carrera (2003) the audit function was not considered a 'profession' in Spain but a mere 'activity'. Consequently, doubtful marketability of the audit certificate and failure in the audit professionalisation process did not attract to public practice newly certified auditors with high human capital, stable jobs and at the younger or older end of the age continuum, that is, those considered as 'talented' by human capital theory (Bröcheler et al., 2004).

During our observation period, a feature of Spanish society was the imposing role of the government in the economy (Carrera et al., 2001) and high levels of uncertainty avoidance (Hofstede, 1997). Furthermore, public sector employees enjoyed a high social status (García Pérez and Jimeno, 2006) because their jobs involved long-term stability, regular salary, predictability, and an internal system of promotion (Hinchliffe, 1987). Such values, which were highly regarded by Spanish society, imposed considerable switching costs on individuals with stable jobs, such as public sector employees; 79% of such individuals, upon completing the examinations leading to the audit certificate, did not apply for an audit licence. Arguably, the joint effects of high legal and financial risks inherent in public practice and high uncertainty avoidance in Spanish society discouraged those with stable jobs from being entrepreneurial and, hence, they remained in their stable income and long-term jobs (Reynolds et al., 2001: 40). Such decisions could also be a result of civil servants' good career prospects; societal claims for public sector accountability boosted its demand

for auditors (Valverdú Calafell, 1984).

Within a context featuring environmental upheaval and good market prospects, our results reveal that factors related to uncertainty outweighed those connected to market opportunities. Consequently, middle-aged professionals with unstable jobs and low general and specific human capital constituted the most likely candidates to apply for auditing licences. However, newly certified auditors with high general and specific human capital, job security, and at the extremes of the age continuum declined engagement in audit practice after earning the audit certificate. In the case of high profile individuals, the turbulent conditions experienced by the auditing profession during the 1976–1988 period and the high uncertainty avoidance of Spanish society arguably offset the prospects for career opportunities coming from market growth and, ultimately, influenced their decision not to become business owner-managers.

The current study examines the unique social conditions featured by Spain during 1976–1988, that is, during the transition from a right-wing military dictatorship to a fully-fledged democracy. Consequently, the approach and findings of this investigation may be useful to time-space intersections featuring similar characteristics. In this respect, further research in this area might capitalise on some of the limitations of the present study. Our paper investigates the auditor's decision as to whether or not to become a licensed auditor at *the time of entry into the profession*. It would be interesting to extend the analysis over the professional life of certified auditors to gain a better understanding of the demography of the audit market. We used educational background and the contractual relationship with large auditing firms as proxy variables for human capital. Although such proxies were consistently employed in the human capital literature, other proxies, such as a firm's investment in training, may provide additional insights into the role of human capital in auditing firms.

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Analysts' perceptions of 'earnings quality'

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Abstract—This paper examines sell-side analysts' perceptions of 'earnings quality'. Prior research suggests that analysts' stock recommendations, price targets, earnings forecasts and written reports are relevant to share price formation. One of the main inputs in analysts' forecasting and valuation models is earnings, and analysts' perceptions of earnings quality are therefore important. There is, however, little direct evidence in the literature on what these perceptions are and on what role they have in decision-making. This paper seeks first to understand earnings quality as interpreted by analysts, and it then tests this interpretation against its actual usage in analysts' research reports. An inductive approach is used that combines interview data with content analysis, and the findings are interpreted in the light of findings from market-based and other research. We find that the concept of earnings quality is both accounting-based (relating to notions of core or sustainable earnings, cash and accrual components of earnings, and accounting policies) and non-accounting-based (relating to information drawn from outside the financial statements). We find more non-accounting than accounting references to earnings quality, and that (relatively subjective) non-accounting references are especially widely used where analysts express positive or negative opinions about earnings quality. It is relatively unusual for an analyst's opinion to be both negative and accounting-based. If, however, an analyst does express negative, accounting-based views on earnings quality, then he or she is highly unlikely to be positive in other respects. We interpret this evidence to be consistent with analysts' economic incentives to generate trading volume yet to be favourably biased towards companies, while seeking to use value-relevant information relating to earnings. We also conclude that the importance of accounting-based information relating to earnings quality is more important than it might seem, and that it exerts a significant influence on the analysis and recommendations in analysts' reports.

Keywords: earnings quality; analysts' reports; analysts' opinions

1. Introduction

This paper examines sell-side analysts' perceptions of 'earnings quality'. Analysts are primary users of accounting information and their role as information intermediaries is well established in the capital markets (e.g. Schipper, 1991). Previous evidence suggests that their stock recommendations, price targets, earnings forecasts and written reports are relevant to share price formation (e.g. Womack, 1996; Barber et al., 2001; Brav and Lehavy, 2003, Asquith et al., 2005). One of the main inputs in analysts' forecasting and valuation models is earnings, and analysts' perceptions of 'earnings quality' are therefore important. There is, however, little direct evidence in the literature on what these perceptions are and on what role they have in decision-making.

This paper seeks first to understand earnings quality as interpreted by analysts, and it then tests this interpretation against its actual usage in analysts' research reports. In the paper's research design, an inductive approach is used that combines interview data with content analysis, and the findings are interpreted in the light of findings from market-based and other research. We conducted 35 interviews with sell-side analysts from 10 leading investment banks and we carried out content analysis on 98 equity research reports for FTSE 100 companies covered by the interviewees.

The interview evidence is that earnings quality is a multifaceted concept and that analysts use both accounting-based and non-accounting-based information when assessing earnings quality. When using accounting-based information, analysts make adjustments to reported earnings that we find to be consistent both with prior survey evidence and with expectations from theory and prior market-based evidence. There is relatively little evidence in the literature, however, on the relative usage of accounting-based and non-accounting-based information, and we explore this issue further in the content analysis. We find that there is a greater prevalence of non-accounting-based information relating to earnings quality, and that this relative usage is consistent across sectors. Motivated by market-based and survey evidence that sell-side analysts are favourably biased towards companies but nevertheless motivated to sell news stories to the market, we explore whether

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the relative usage of accounting-based and non-accounting-based information varies depending upon whether analysts are expressing a positive or negative opinion about a company. Consistent with prior evidence on bias, we find that analysts are significantly more often positive than negative when discussing earnings quality. We also find a significantly greater relative use of non-accounting-based information when a directional opinion – either positive or negative (but not neutral) – is expressed; we interpret this to be consistent with analysts being motivated to sell news stories, because non-accounting information is more subjective and wide-ranging, and so inherently more amenable to analysts credibly expressing diversity of opinion. We also find, however, that in spite of being less frequently used, in general and in particular when positive or negative views are expressed, accounting-based information nevertheless plays an important role in anchoring and constraining analysts' views. Specifically, we find that, in cases where analysts are positive on accounting aspects of earnings quality, they are 'free' to be either positive or negative on non-accounting aspects, but that if they are negative on accounting aspects, then they are, in effect, constrained to be negative overall. This conclusion is reinforced by further evidence that analysts are most unlikely to issue a buy recommendation when they feel negative about accounting-based aspects of earnings quality, even though there is an overall bias in favour of buy recommendations. Accounting-based information is therefore argued to be more influential than it might at first seem.

The rest of the paper is organised as follows. Section 2 reviews theory and empirical evidence relating to earnings quality. Section 3 discusses research methodology. Interview findings are presented in Section 4, followed by evidence from analysts' reports in Section 5. Section 6 concludes the paper.

2. Earnings quality – theory and evidence

This paper addresses earnings quality from a users' perspective. The paper seeks first to understand earnings quality as interpreted by analysts, and it then tests this interpretation against its actual usage in analysts' research reports.

Earnings measurement is central to the use of financial statements in evaluating historical performance, forecasting future performance and valuing equity (Ohlson, 1995; Penman, 2004). A frequently-used term relating to the effectiveness of earnings measurement and the usefulness of earnings is 'earnings quality', whereby a company exhibiting high earnings quality is viewed more favourably by users of financial statements than a company with low earnings quality. Yet, as noted by Schipper and Vincent (2003), 'although the phrase "earnings quality" is widely used, there is neither an agreed-upon meaning assigned to the phrase nor a generally accepted approach to measuring earnings quality.'

The literature contains several possible earnings quality constructs. One relates to the time-series behaviour of earnings. In empirical studies of the share price reaction to unexpected earnings, a larger earnings response coefficient is associated with earnings that are more persistent, sustainable or recurring (e.g. Kormendi and Lipe, 1987). This accords with theory, whereby earnings with greater persistence warrant a higher valuation multiple (e.g. Ohlson, 1995). A similar construct is predictive value, whereby earnings of a high quality are those that can better predict earnings in future periods. Although persistence and predictive value might typically go hand in hand, Schipper and Vincent (2003) note that volatile earnings might be high quality as measured by persistence (i.e. the earnings time series follows a random walk) but low quality as measured by predictive value (i.e. low serial correlation in the earnings time series). The actual time-series behaviour of earnings can be attributed jointly to inherent attributes of the entity's business environment and to the effectiveness of accounting in capturing these attributes. Accordingly, an alternative perspective on earnings quality is based upon understanding accounting choices and limitations. For example, Schipper and Vincent (2003) define earnings quality in terms of the unobservable benchmark of Hicksian economic income (Hicks, 1939), with the aim being to compare reported accounting income with the 'ideal' measure of change in economic value. Empirical tests of accounting measurement have focused on the use of discretionary accruals to measure the extent of earnings management; the higher the use of discretionary accruals, the lower the quality of earnings (Jones, 1991; Dechow et al., 1995; Burgstahler and Dichev, 1997). This approach differs from a time-series focus, although there is similarity to the extent that accruals exhibit lower persistence than operating cash flows (Sloan, 1996).[1]

A consistent finding in prior research is that the stock market places substantial reliance on analysts' research (Fogarty and Rogers, 2005; Frankel et al., 2006), including earnings forecasts (Stickel, 1991; Francis and Soffer, 1997), recommendations

[1] Accrual accounting is typically argued to make earnings more *relevant* than cash flows for assessing firm performance, while cash flows may be more *reliable* than earnings because accruals require judgment and estimation. The use of cash flow as an alternative metric has gained increasing popularity in the literature (Dechow, 1994; Sloan, 1996; Barth et al., 2001; DeFond and Hung, 2003). The notion that cash flows are useful in validating the information in earnings that contain large accruals is consistent with Penman (2004) and Wild et al. (2003).

(Womack, 1996; Barber et al., 2001) and target prices (Brav and Lehavy, 2003). Moreover, it is not only the headlines in analysts' reports that convey value-relevant information but also the text of the reports and the justifications therein (Krishnan and Booker, 2002; Asquith et al., 2005).

Given this evidence of the importance of analysts and of their earnings forecasts and related information, it becomes important to understand how analysts interpret and communicate value-relevant information. In the context of the current paper, the focus is on analysts' usage of information relating to earnings quality. The evidence from market-based research is that the market places greater reliance on measures of earnings that have been adjusted by analysts for one-off or transitory items (Lin and Walker, 2000; Bradshaw and Sloan, 2002; Bhattacharya et al., 2003; Brown and Sivakumar, 2003). Gu and Chen (2004) find that, for any given category of earnings, analysts' subjective assessments are effective in determining which components of the category to include in sustainable earnings ('street earnings') and which to exclude. Survey evidence broadly supports these findings (Barker, 2000). In addition, studies employing either survey methods (such as Arnold and Moizer, 1984; Pike et al., 1993; and Barker, 1999), protocol analysis (Day, 1986) or content analysis (Bradshaw, 2002; Demirakos et al., 2004) find that the price earnings (PE) ratio is the dominant valuation model used by analysts, which reinforces the importance that analysts place on their measures of sustainable earnings (the E in PE), and hence on earnings quality.

Research directly investigating the concept of perceptions of earnings quality is rather limited. Siegel's (1982) survey identifies the concept of earnings quality as negatively associated with the number of accounting policy changes made by a company. Also employing a survey methodology, Graham et al. (2002) find that analysts associate a high quality of earnings with high growth, low risk and a high degree of persistence, and also with the source of the earnings in terms of segmental line of business and geographical breakdowns. Other factors mentioned by analysts included the quality of management, the level of disclosure and the accounting policies in use. Using a content analysis, Bricker et al. (1995) found that analysts focus on core earnings and associate high earnings quality with near-term earnings predictability (where the notion of predictability is both economic, in terms of a low level of earnings volatility, and due to accounting, in terms of management discretion over the establishment and adjustment of certain conservative reserves, allowances, and off-balance-sheet assets).

3. Data and methodology

This paper employs two research methods – semi-structured interviews and content analysis. The interviews are used to provide an initial categorisation of analysts' perceptions of earnings quality and the content analysis is used to test this categorisation, and to derive findings from it. The two research methods are closely linked in order to enhance the validity of each: the content analysis is applied to the interviewees' descriptions of earnings quality in research reports written by the interviewees. The approach is inductive, building on prior research to investigate a little-understood area and to derive theory and insight from empirical evidence.

We conducted 35 semi-structured interviews with sell-side analysts from 10 leading investment banks selected from the Extel Survey. The Extel Survey every year ranks the top 25 pan-European brokerage firms across equity sectors. We selected the dominant 15 firms from these 25 from the 2002 Extel Survey to conduct 40-minute interviews within equity research departments. We selected the leading firms, in part because they dominate the market and also because there is evidence (Hussain, 2002; Jacob et al., 1999; Clement, 1999) that brokerage house size (a proxy for analysts' resources and support systems) is an important factor impacting the quality of analysts' research. Ten firms (66%) agreed to participate in the study, which is a similar response rate to comparable studies (Day, 1986; Holland, 1998; Barker, 2000).[2] The sample comprises five broad sectors (financial, industrial, media, retail and technology). The mean experience and number of companies covered by each analyst was 6.5 years and 11 firms respectively.[3] The interviews were conducted in late 2002/early 2003. Table 1 presents details of the sample.

The interview questionnaire, which also formed part of a wider study, contained two questions relating to the definition of earnings quality. First, analysts were asked to indicate which items of profit or loss they typically exclude from their measure of earnings. The list of items included/excluded (see Table 2) was based on three principal sources, namely FRS 3 (ASB, 1992), UKSIP's 'headline earnings' (UKSIP, 1993) and S&P 'core earnings' (S&P, 2002). Second, analysts were asked an open, free-form question about what the term 'earnings quality' meant to them. Analysis of their responses to this question proceeded by first transcribing the interviews and by then highlight-

[2] The composition of brokerage firms' research reports content analysed by Hussainey et al. (2003) is also broadly similar.

[3] Clement (1999) finds that forecast accuracy is positively associated with analysts' experience (a surrogate for analyst ability and skill) and negatively associated with the number of firms and industries followed by the analyst (measures of task complexity).

Table 1
Distribution of the sample (interview and content analysis)

	Interviews				*Content analysis*			
Sectors	*Total analysts interviewed*	*Total reports analysed*	*Total pages*	*Total words*	*Pages per report*		*Words per report*	
					Mean	*Median*	*Mean*	*Median*
Financial	5	17	527	106,099	31	28	6,241	4,877
Industrial	9	15	429	87,550	29	24	5,837	4,365
Media	4	19	710	126,699	37	32	6,668	4,986
Retail	4	26	930	187,904	36	26	7,227	6,079
Technology	9	21	761	124,720	36	28	5,939	4,965
Total	**31**	**98**	**3,357**	**632,972**	**34**	**28**	**6,459**	**5,005**

Note: 'Financial' includes bank and insurance. 'Industrial' includes engineering, aerospace and defence, electronics and capital goods, building materials, paper and packaging, mining and metal. 'Media' includes service and media. 'Retail' includes general retail and food retail. 'Technology' includes telecommunications and technology, and 'Other', not shown in this table, includes one strategist, one head of equity research and two analysts specialising in accounting aspects of equity research. We did not collect any reports for the four analysts in the 'Other' category.

ing frequently occurring themes to develop a keyword dictionary for content analysis (Miles and Huberman, 1994, and see below). Interviews are a means to understand how individuals construct the meanings and significance of their situations (Holland, 1998; Easterby-Smith et al., 2002) and in particular in this context to understand the constructs that the interviewee uses as a basis for his or her interpretation of earnings quality. In turn, content analysis can then be used to test the interview findings against the hard evidence provided in the published analysts' reports.

Content analysis relies on the content of communication as the basis of inference (Holsti, 1968). One of the main strengths of content analysis, as noted by Breton and Taffler (2001), is that it is particularly appropriate for research using analysts' reports, both because of its unobtrusive nature in analysing narratives prepared for other reasons and audiences and because of its ability to measure the implicit importance attributed to an information category by the report's author. Sell-side analysis is an unusually rich subject because the norm is for analysts to generate in-depth reports summarising, for the clients' benefit, the output of the analyst's research. It is not surprising that the content of analysts' reports is value-relevant (Asquith et al., 2005; Fogarty and Rogers, 2005).

Against these benefits of content analysis is the issue of whether analysts' reports provide an objective source of information. The evidence is that they are actually biased, which we therefore take into consideration in the interpretation of the reports and the analysis of findings. Specifically, prior research finds that analysts' forecasts contain an optimistic bias, particularly when the analysts act as underwriters (Dugar and Nathan, 1995; Michaely and Womack, 1999) or investment bankers (Hussain, 1996; Lin and McNichols, 1998) of the companies whose earnings they estimate. O'Brien et al. (2005) suggest that this optimism is due, among other things, to analysts aiming to maintain good relationships with corporate management and to good stories being easier to sell than bad ones. Forbes and Skerratt (1992) present evidence that the market recognises this bias. Consistent with this, Hirst et al. (1995) find that, when an analyst issues an unfavourable report about a company, it is given greater weight by investors if the analyst is affiliated to the company, because the analyst's stated view is unfavourable notwithstanding his or her inherent bias. Similarly, Frankel at al. (2006) find that negative forecast revisions are more informative than positive revisions. This evidence suggests that there is something to be learned from a distinction between analysts' positive and negative perceptions of earnings quality, which we therefore explore in this paper.

For the purposes of the content analysis, we used the Investext Plus database to select equity research reports for FTSE-100 companies for each interviewee. In order to provide a controlled experiment, we limited our study to only the five sectors and the 10 investment banks in the interview sample. Out of the FTSE 100, for the period July

2000 to June 2003, 52 companies were covered by the interviewees and have reports available in the Investext Plus database. We selected reports for these companies that were at least 15 pages in length (comprehensive company reports were considered more relevant than 'morning notes' or sector reports).[4] If there was more than one report for a particular company in a single year, we took the most recent report. We limited each analyst to a maximum of three reports on any given company. Our resulting sample comprised 98 reports in total, as summarised in Table 1.

An essential element of content analysis research design is the selection and development of categories into which content units can be classified. There are two alternative approaches: 'form oriented' (objective) analysis, and 'meaning oriented' (subjective) analysis (Smith, 2003). 'Form oriented' involves routine counting of words whereas 'meaning oriented' involves the analysis of the underlying themes in the texts. Weber (1990) argues that word categories inferred from covariation among high-frequency words are more reliable than themes. However, Krippendorff (1980) suggests that for many content analyses, thematic units, which require user judgment in the determination of the hidden messages conveyed in the narratives, may be preferable despite difficulties in application. In this study, like previous studies (Clatworthy and Jones, 2003; Smith and Taffler, 2000), content analysis was both form- and meaning-oriented.

The research design of the content analysis was driven by the interview findings. For the form-oriented content analysis, the words used by interviewees to describe earnings quality formed a keywords dictionary in TextQuest (Weber, 1990; Neuendorf, 2003).[5] We categorised the keywords into two broad categories of information relating to earnings quality – accounting-based and non-accounting-based.[6] In all cases, we categorised the keywords according to their context; whenever out of context, keywords were eliminated from consideration – for example, the word 'growth' was used in relation to earnings sustainability in the interviews and we excluded it in content analysis if it was used in relation to growth in GDP or some other factor.[7] Hence the keywords from the interview data were the basis for the content analysis of the reports, and there was not a simple count of word frequency but instead of words in appropriate context. This is important because (for example) some words may have multiple meanings or be used in different contexts.

In their theme-based content analysis of the chairman's statement, drawing on theory and evidence that accounting narratives are likely to be self-serving rather than objective, Clatworthy and Jones (2003) make a distinction between narratives that concern good news as opposed to those that concern bad news (see also Smith and Taffler, 2000). Similarly, we are guided in this paper by evidence that analysts are favourably biased towards the companies they research, and so our theme-based content analysis is structured around a distinction between positive and negative perceptions of earnings quality. For example, if an information unit discussed reported profit in excess of expectations, we classified this as accounting-positive. We assigned '1' to each unit mentioned in the narratives and added those up to calculate the total score for 'positive' and 'negative' and then divided this by the total number of sentences to get a theme score. By focusing on those cases where the analyst expresses a directional opinion – positive or negative, as opposed to neutral – we are able to gain insight into the extent to which analysts' opinions and recommendations are driven by accounting-based as opposed to non-accounting-based information.

In addition, for the theme-based analysis, consistent with the findings of Asquith et al. (2005) on the importance of the strength of an argument, we were able to test the extent to which there was both strength and direction in the analysis. This methodology is similar to both Breton and Taffler (2001) and Smith and Taffler (2000).

As noted by Clatworthy and Jones (2003) and Abrahamson and Amir (1996), it is difficult to develop a reliable coding scheme and any coding scheme is best carried out more than once in order to test inter-coder reliability. To verify the reliability and consistency of the adjustments of word variable according to keywords-in-context (KWIC) and calculation of theme score, a second researcher conducted independent adjustment and coding.[8] In addition, we analysed the text twice for theme-based content analysis.[9]

It must be acknowledged that there are two important limitations to content analysis. The first is that any classification rule is necessarily subjec-

[4] Morning notes are typically only a few pages long and sector reports consist of summarised information about the comparable companies in the sector (the analysts' cover) with a special focus on the sector and market outlook.

[5] TextQuest is a program designed for analysis of texts. See Neuendorf (2003) and http://www.textquest.de/eindex.html.

[6] Keywords were included only if they were used by analysts in the interviews, and all such words were included.

[7] By only examining keywords in context, the risk of spurious word counts is minimised; while all included words are implicitly and unavoidably assumed to be of equal importance, out-of-context words are excluded.

[8] We used Cohen's Kappa test and the agreement percentage was satisfactory (70%). See Neuendorf (2003) for details of inter-coder reliability testing.

[9] A unit was not coded as positive or negative if the sentence or clause was neutral or ambiguous. This is one of the reasons why the theme score in Table 5 is much lower than the keyword count in Table 6.

Table 2
Earnings adjustments

Please indicate which items you include or exclude for adjusted earnings	*Include*	*Exclude*	*Depends/Not sure*
Depreciation	35	0	0
Interest expenses	33	1	1
Pension (service cost)	32	3	0
Pension (interest cost)	31	4	0
R&D expenses	29	4	2
Stock compensation	21	8	6
Operating expenses (one-off)	14	9	12
Provisions for future cash outflows	13	8	14
Restructuring costs	10	11	14
Gains or losses on financial assets	6	22	7
Impairment losses on fixed assets	6	28	1
Revaluation gains on fixed assets	6	24	5
Discontinued activities	4	23	8
Impairment of goodwill	4	27	4
Amortisation of goodwill	3	28	4
Gains or losses on asset disposals	2	23	10
Exceptional items	1	16	18

tive to some extent. However, we only make two classifications (accounting-based vs non-accounting-based and positive vs negative) and we make the classification by reference to interview data. Second, by basing inference on the frequency of information that appears in the text, there is an implicit (and contestable) assumption that all items of information are of equal importance. However, here again there is an additional safeguard in our research design, which is that we only include keywords in context – i.e. we are not counting a given word every time it is used but instead are only including it when it is used in the reports in the same context that it was used in the interviews.

4. Interview findings

Table 2 reports interviewee responses on adjustments made to reported earnings. The findings are presented in order of the frequency with which they are typically included in the analyst's measure of earnings.

Consistent with theory and with the market-based and survey evidence reported in Section 2, the items included are those that form part of the ongoing earnings stream. Items that are excluded relate to activities that are one-off in nature or discontinued, or else they result from remeasurements – i.e. from valuation adjustments, resulting from revisions to the carrying amounts of assets or liabilities, that have a multiple of one and little or no predictive value for future earnings (Barker, 2004). In cases where there is not a clear-cut distinction between items that are included or excluded, the item in question could include items that are either ongoing or one-off. Specifically, 'one-off' operating expenses, restructuring costs or exceptional items could be reported as one-off but, given the inherent subjectivity in their determination and, in some cases, the regularity of these expense categories, analysts may not perceive them to be one-off. Provisions for future cash outflows could take place regularly and so be an ongoing expense, or there could be, for example, a gain or loss on the remeasurement of an asset retirement obligation, which would not form part of ongoing earnings. Finally, gains or losses on asset disposals may, or may not, be a part of ongoing earnings depending upon whether the entity is in the business of assets sales (e.g. with significant turnover of investment properties) or not (e.g. with the occasional disposal of a head office or similar asset). The only exception in Table 2 to this analysis is the amortisation of goodwill which, although recurring, is excluded. This can be regarded as a special case – as an accounting anomaly with no relevance to the prediction of future cash-flow generating capacity.

These findings are broadly consistent with both the theory and evidence reviewed in Section 2 (e.g. Kormendi and Lipe, 1987; Bradshaw and Sloan, 2002) that analysts use components of reported financial performance to generate a measure of sus-

tainable earnings. The most directly comparable survey evidence can be found in Barker (2000), which addresses analysts' treatment of items reported as exceptional under the accounting standard FRS 3 (ASB, 1992). Although limited in scope when compared with Table 2, Barker's findings are consistent: analysts universally included recurring exceptional items in normalised earnings, whereas most excluded items are typically one-off (non-recurring exceptional items, and profit or loss on asset sales and on sale/termination of operations), and the only item that generated mixed views was reorganisation costs, where the difference in opinion arose because some analysts viewed these as one-off while others did not.

Analysts were also asked in the interviews to elaborate on their understanding of the definition of earnings quality. A majority of analysts (27 out of 35) described earnings quality in terms of some aspect of the 'core' earnings of the firm. For example, revenue from core operations generates higher earnings quality than income from non-core, non-sustainable sources such as gains on the disposal of assets. In general, interviewees regarded organic growth in the core business as the most likely source of high quality earnings. These earnings are more likely to be sustainable in the future, and because they are more repetitive and perceived to be more controllable by the company, they can be forecasted with greater reliability.[10] For example, a bank analyst described interest income and commission as high quality earnings since these are more readily sustainable in the future, whereas trading profit was viewed as more volatile and so lower quality. For a software analyst commenting on three sources of income – maintenance, service, and licence – licence income was considered relatively high quality because of its relative sustainability. The following quotations from the analysts' interviews are illustrative:

> 'We try to assess the earnings growth ... is it coming from the core business? Is it predictable or not? Low predictability means low earnings quality.' (Media analyst)

> 'High quality ... comes from long term contractual agreements. Low quality comes from few one-off contracts.' (Technology analyst)

The categorisation of sources of earnings, whether on the face of the income statement or in the notes, is therefore important to analysts. This is consistent with the earlier evidence presented in Table 2, and also with the evidence reported in Section 2, that the analyst is trying to isolate categories of earnings that have greater sustainability.

Consistent with theory and empirical research, analysts also mentioned the cash generating ability of the company. Out of 35 analysts, 17 perceived the relationship between earnings and cash flow from operations to be an important determinant of earnings quality. They argued that the greater the component of accruals in reported earnings, the less reliable earnings become for the purpose of forecasting and valuation. Their comments were restricted to a high-level comparison between the flow statements – income statement and cash flow statement – and did not extend to a discussion of changes in the balance sheet as a route to understanding the impact of accounting policy choice on earnings quality. For example, one analyst commented as follows.

> 'We see how earnings are improving. Are these accounting manipulations? That is why we use adjusted earnings in PE because reported earnings may not reflect cash flow.' (Industrial analyst)

Consistent with the findings of Siegel (1982) and Bricker et al. (1995), some 11 analysts argued that consistently-applied, conservative accounting policies are important in judging earnings quality. Whether the company uses a consistent method was mentioned by seven analysts, with change being an indicator of low quality earnings. Whether a company adopts conservative accounting policies was mentioned by eight analysts.

> 'There are lot of ways you can measure it. The easiest way for retailers is depreciation. If you write off an asset more quickly then you are more conservative. You have positive or good earnings quality. We also look for exceptional costs in many years. Many exceptional items mean low quality.' (Retail analyst)

Finally, some 13 analysts described earnings quality in terms of non-accounting information, including factors such as the expected effectiveness of the company's business model in its chosen markets and the perceived quality of management, including the willingness of the management team to disclose information and provide guidance. For example, if the company has many divisions but only group activities are presented, then this is deemed to indicate low quality earnings. Management can be helpful in guiding the estimation of key value drivers, notably revenue, operating costs and capital expenditure. The following response reflects some of these wide ranging issues.

> 'It is subjective. It depends on the quality of disclosure. If there are lots of business lines, different products and you only have one accounting policy of revenue recognition which is only

[10] An indication of the importance attached to management control is that several interviewees mentioned frequent change in earnings estimates as evidence of low predictive ability.

two lines long – this does not give you much confidence in terms of quality of earnings.' (Accounting specialist)

The interview findings reveal that earnings quality is a multifaceted concept. Analysts broadly consider two types of information in defining earnings quality. The first, accounting-based information, which is sourced directly from the financial statements themselves, comprises income about the sources of earnings, the impact of accruals and the effects of accounting policies. The second, non-accounting-based information, which is derived from data outside the financial statements, is more broadly concerned with the markets in which the entity operates and the effectiveness of management in designing and implementing strategies to compete successfully in those markets. To illustrate, two entities may have the same level of earnings, but one may have a greater proportion of those earnings in core businesses, backed by cash and with consistently-applied underlying accounting policies, and so will have higher earnings quality, as judged using accounting-based information. Alternatively, earnings quality could be judged to differ on the basis of non-accounting information. For example, two entities may be equivalent in terms of the source of earnings, cash-backing and accounting policy, yet the entity with the management team that inspires greater confidence will be deemed to have the higher quality earnings.

An interesting implication of these findings is that non-accounting information is used to contextualise and add meaning to accounting data, i.e. the quality of earnings is not purely an accounting concept. This finding adds insight to previous studies, such as Barker (1999) and Breton and Taffler (2001), which have sought to contrast accounting vs non-accounting information, rather than viewing each as offering alternative perspectives on accounting data. A consistent finding of previous survey research, such as Pike et al. (1993), Barker (1999) and Holland (1998) is that perceptions of management quality and discussions with management on ostensibly non-accounting subjects are a more important source of information than the financial statements (see also Day, 1986). If, however, these non-accounting information sources are in practice important in the context of interpreting earnings quality (i.e. accounting data) then, especially in the light of the evidence reported earlier that the PE is the dominant valuation model, the importance of accounting information is perhaps understated by these studies. This interpretation is consistent with Hussain (2002), who finds a relationship between the size of firms of analysts and forecasting performance, which he suggests may be due to larger firms having superior access to company management; this finding suggests that non-accounting-based information is used to enhance the assessment of the quality of current-period earnings and, so, the forecasting of future earnings.[11]

5. Evidence from analysts' reports

The data from the form-oriented analysis is summarised in Tables 3 and 4. It is worth repeating that this is not a simple word count but rather is a summary of keywords in context – i.e. words are counted only if, first, they were used by analysts in the interviews and, second, they were used in the same context as in the interviews. Hence the content analysis is a direct test of the evidence from the interviews.

Table 4 reports total accounting and non-accounting keywords by sector. In total, there are somewhat more non-accounting keywords used in the reports, which reinforces the interview evidence above that earnings quality is not an issue of financial statement data alone. In other words, while analysts will try to understand earnings quality from the financial statements themselves, they acknowledge the inherent limitations of financial statement data as a basis for understanding and predicting future performance, relying somewhat more heavily on information sources that are outside the financial statements. A chi-square test, as reported in Table 4, finds that this difference in usage between accounting and non-accounting information is highly significant.

While one might think that the reliance on non-accounting-based information would vary by sector, because the financial accounting model is more or less able to capture economic fundamentals across sectors (see, for example, Hand and Lev, 2003), a striking feature of Table 4 is that this is not the case. Viewed on a sector basis, there is a remarkable consistency in the ratio of accounting to non-accounting keywords, with the former in the narrow range 41%–46% across all five sectors. This consistency suggests that a standardisation of report-writing style and analytical approach dominates any inherent variation in the usefulness of accounting information that might exist across sectors. Possibly this is because fund managers' valuation models and hence information demands are similar irrespective of sector and that they therefore prefer sell-side analysts to present information consistently. Alternatively, it demonstrates inherent limitation in fundamental analysis, because a 'one-size-fits-all' approach is employed in spite of underlying differences in economic and accounting fundamentals across sectors.

In Table 5, in addition to the accounting and

[11] Hussain (2002) notes that the significance of this effect appears to hold for short-term forecasts only. He notes but does not explore the issue of whether broker status has an incremental effect.

Table 3
Keywords dictionary (based on keywords in context from interview data)

Accounting-based	*Frequency*	*Non-accounting-based*	*Frequency*
Keywords (related theme)	*In reports (percentage of total keywords in the category)*	*Keywords (related theme)*	*In reports (percentage of total keywords in the category)*
Growth	3,294 (37.00%)	Market	3,396 (29.53%)
Cash flow	1,108 (12.45%)	Business model	2,361 (20.53%)
Operating	662 (7.44%)	Customer	1,592 (13.84%)
Certain/Predictable	403 (4.53%)	Acquisition	923 (8.03%)
Core/Source	401 (4.50%)	Management	886 (7.70%)
Sustainable	281 (3.16%)	Strategy	564 (4.90%)
Adjusted/Normalised	278 (3.13%)	Contract	478 (4.16%)
Trading	278 (3.13%)	Disclosure/Guidance	458 (3.98%)
Organic	243 (2.73%)	Disposal	274 (2.38%)
Predictable/Stable	220 (2.47%)	Restructuring	133 (1.16%)
Conservative/Defensive	203 (2.30%)	Credible/Reliable	91 (0.79%)
Aggressive	201 (2.26%)	Pessimistic (pessimism)	89 (0.77%)
Underlying	187 (2.10%)	Optimistic (optimism)	88 (0.77%)
Consistent/Consistency	177 (1.99%)	Manifest/Distort	85 (0.74%)
One-off/Exceptional	172 (1.93%)	Transparency	65 (0.56%)
Continuing	165 (1.85%)	Discretionary	17 (0.15%)
Ongoing	116 (1.30%)		
Cyclicality	115 (1.18%)		
Visible	99 (1.12%)		
Persistence	88 (0.99%)		
Variability/Volatile	88 (0.99%)		
Transitory	56 (0.63%)		
Unusual	37 (0.41%)		
Recurring/Repeat	30 (0.33%)		
Total	8,902 (100%)	Total	11,500 (100%)

Note: We only selected those words that analysts used to define earnings quality during the interviews after doing appropriate adjustments by KWIC. Although these cover only a small percentage of total words, they capture the keywords that the interviewees used during the interviews in defining earnings quality.

Table 4
Total keywords across sectors

Keywords	*Financial*	*Industrial*	*Media*	*Retail*	*Technology*	*Total*
Total accounting	1,488 (45%)	1,060 (46%)	1,588 (43%)	2,835 (44%)	1,931 (41%)	8,902 (44%)
Mean per report	88	71	84	109	92	91
Total non-accounting	1,815 (55%)	1,264 (54%)	2,081 (57%)	3,547 (56%)	2,793 (59%)	11,500 (56%)
Mean per report	107	84	110	136	136	118
Total keywords	3,303 (100%)	2,324 (100%)	3,669 (100%)	6,382 (100%)	4,724 (100%)	20,402 (100%)

Note: This table is based on form-oriented content analysis. χ^2 for Accounting v. Non-accounting words across sectors is 22.1, ($p = 0.0002$).

Table 5
Theme score across sectors

	Financial		*Industrial*		*Media*		*Retail*		*Technology*		*Total*		
Classification	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Total*
Accounting	105 (0.022)	48 (0.01)	81 (0.026)	37 (0.012)	83 (0.014)	40 (0.007)	182 (0.028)	48 (0.007)	151 (0.026)	86 (0.015)	602	259	861
Non-accounting	202 (0.042)	186 (0.039)	114 (0.037)	86 (0.028)	167 (0.028)	166 (0.028)	209 (0.032)	241 (0.04)	279 (0.045)	206 (0.035)	971	885	1,856
Total	307	234	195	123	250	206	391	289	430	292	1,573	1,144	2,717
Chi-sq test (p-value)	χ^2 =12.27 (0.0005)		χ^2 =4.24 (0.0394)		χ^2 =10.89 (0.001)		χ^2 =66.54 (0.000)		χ^2 =2.53 (0.1117)		χ^2 =74.75 (0.000)		

Note: The figures in parentheses show the theme variable which is calculated as total theme score divided by total sentences.

non-accounting classification used earlier, and in the light of evidence on analysts' bias towards companies, sentences are also classified according to whether keywords are used in a positive or negative context. This theme-based analysis adds power to Table 4 in that the emphasis is now more active – rather than simply counting keywords in context, the analysis is directional and indicates whether or not the analyst has a favourable view of the company being analysed. So, for example, in the industrial sector, there are 195 positive references to earnings quality, of which the majority (114) are from non-accounting sources, while there are 123 negative references.[12] Chi-square tests, reported in Table 5, show a significant difference within sectors in the frequency of positive and negative related themes relating to accounting vs non-accounting information; the results are significant at the 1% level for financial, media and retail, and at the 5% level for industrial (although not significant for technology).

Consistent with the evidence in Table 4, non-accounting keywords are used more often than accounting keywords. However, the directional data in Table 5 offer four additional insights. First, there are significantly more positive references to earnings quality than there are negative references. This is reassuringly consistent with the empirical evidence summarised earlier that analysts have a favourable bias towards companies, at least in the context of their public communications. Second, non-accounting words are used relatively more – approximately twice as often – than for the non-directional data reported in Table 4. Alternatively stated, when an analyst is expressing a positive or negative opinion about a company's earnings quality (as opposed to a neutral opinion), he or she is more likely to do so by reference to non-accounting information. This is consistent with analysts having the dual objective of generating commission income by introducing news stories to the market (in this case in the form of opinions about earnings quality) while also retaining credibility as reliable providers of information (Barker, 2000). Since accounting-based information is more readily verifiable than non-accounting-based information, analysts have more latitude in using non-accounting-based information without being shown to be wrong. Hence, they are more likely to use non-accounting-based information as the basis of news stories. This is consistent with Breton and Taffler's (2001) conclusions on the greater usage of non-financial information, as well as with Fogarty and Rogers (2005), who argue that while accounting information provides essential support for an analyst's arguments, it is typically not used as the main substance of a case. Finally, there is a parallel here with Clatworthy and Jones (2003), who identify inherent bias in the narrative of the chairman's statement, relative to the more objective and audited financial statements; the present study identifies a comparable bias in the non-accounting-based elements of analysts' reports.

The third insight from Table 5 is that, in aggregate, there are similar numbers of positive and negative non-accounting references to earnings quality, whereas accounting references are more than twice as often positive as negative. This reinforces and adds to the first two insights above. Given that, first, analysts are inherently biased towards companies and, second, they are incentivised to generate non-refutable news stories, it is not surprising that negative opinions based upon readily-verifiable accounting information are used sparingly: of the total of 2,717 theme scores reported in Table 5, a little fewer than 10% are negative and from accounting sources. If an analyst has a biased predisposition towards a company, yet he or she cannot credibly report only positive opinions about the company, then making a relatively objective, accounting-based case against the company is less appealing than making a negative case using more subjective non-accounting-based information.

The final insight from Table 5, which is consistent with Table 4, is that the findings are broadly consistent across sectors. This applies in particular to the relative usage of accounting and non-accounting words, and also in most sectors to the observation that there is a similar number of positive as negative non-accounting references to earnings quality, whereas accounting references are more than twice as often positive as negative. Hence, for example, analysts' disincentive to report negative, accounting-based news is universal across sectors.

Table 6 explores further analysts' bias towards companies by classifying each report according to whether the analyst is (on balance) positive on both accounting-based and non-accounting-based information, negative on both, or positive on one and negative on the other. For example, if a report is placed in Category 2, then the analyst perceives earnings quality positively on the basis of accounting information but negatively on the basis of non-accounting information. This might arise, for example, if earnings are generated within core activities and backed by operating cash flow, but the management is perceived not to have in place an effective strategy for sustainable performance.

Overall, the reports are positive, which is again consistent with the evidence on analysts' bias (53% of reports are in Category 1 and uniformly positive, against 19% in Category 4 that are uniformly negative; the corresponding chi-square test,

[12] Note that the total number of keywords differs from Table 4 because neutral cases (i.e. where there is neither a positive nor a negative opinion clearly expressed) are excluded.

Table 6
Classification of individual reports

	Accounting information		
	Positive dominance	Negative dominance	Total
Non-accounting information			
Positive dominance	Category 1 (53)	Category 3 (4)	57
Negative dominance	Category 2 (22)	Category 4 (19)	41
Total	75	23	98

Note: The figures in parentheses show the number of reports in each category. 'Positive dominance' for accounting information means that within an individual report there were more positive than negative sentences concerning accounting-based information relating to earnings quality, i.e. 75 reports were on balance positive with respect to accounting-based information on earnings quality. Chi-square is 20.53 ($p = 0.000$) which suggests there are significant differences in accounting and non-accounting positive v. negative dominance).

as reported in Table 6, is highly significant). For the most part, there is a strong congruence between the analysts' views of earnings quality measured according to both accounting-based and non-accounting-based criteria – taken together, Categories 1 and 4 account for 72 of the 98 reports, or 73%. This is not surprising because it is likely that there are similar factors behind the analysts' perceptions of earnings quality from both accounting and non-accounting sources. Moreover, given that the analyst's aim is to persuade clients to trade based upon an authoritative analysis and recommendation, a report that contains conflicting signals is likely to be less effective.

Of the remaining two categories where the signals are conflicting, it is far more likely that analysts are positive based upon accounting sources while being simultaneously negative based upon non-accounting sources (Category 2, 22% of reports) rather than vice versa (Category 3, 4% of reports). Of the 57 cases where the analyst is positive with respect to non-accounting-based perceptions of earnings quality, it is most unlikely that he or she would be negative on accounting criteria (this happens in only four cases, or 7%). In contrast, however, if an analyst is, on balance, negative with respect to non-accounting-based perceptions of earnings quality, then he or she is more or less equally likely to be positive or negative on accounting criteria (54% and 46%, respectively). Hence, if, in spite of inherent bias in favour of companies, an analyst is willing to be, on balance, negative about accounting-based (and so relatively verifiable) earnings quality, then this is typically inconsistent with being positive about non-accounting (and so relatively subjective) perceptions of earnings quality. In other words, it is difficult for an analyst to be glowing about a company having great prospects and strong management if the financials do not back up the claims. On the other hand, a positive view of accounting-based earnings quality does not guarantee that the non-accounting view will be positive also. Here the analyst has greater choice to express a subjective opinion, for example, that the company has done well but does not have the right strategy to sustain performance. Overall, an analyst can be sceptical if financial performance is strong but cannot be optimistic if financial performance is weak. On balance, therefore, accounting information matters more than at first apparent.

This conclusion on the relative importance of accounting information links in with the findings from Tables 4 and 5. Taking Table 4 alone, it would appear that non-accounting-based information is somewhat more important in analysts' perceptions of earnings quality, while Table 5 adds to this conclusion by showing that analysts' directional views are even more likely to be based upon non-accounting sources. Yet Table 5 also shows that accounting-based information is more discriminatory, in that negative views are relatively infrequent. The evidence in Table 6 suggests this infrequency of negative, accounting-based views understates its importance, because taking a negative accounting-based view effectively rules out taking a positive non-accounting-based view, whereas the reverse is not true. This finding supports and provides insight into market-based evidence that, given analysts' inherent bias in favour of companies, the market reacts more strongly to analysts' adverse opinions than to their favourable opinions (e.g. Hirst et al., 1995).

These findings complement prior research into qualitative information in financial reporting (see, for example, Smith and Taffler, 1992a, 1992b and 2000). To the extent that there is obfuscation and speculative content in analysts' reports, the evi-

Table 7
Association with recommendations

		Financial	*Industrial*	*Media*	*Retail*	*Technology*	*Total*
Category 1	Buy	8	7	9	12	9	45
	Hold	1	2	0	1	2	6
	Sell	0	2	0	0	0	2
Category 2	Buy	5	1	2	2	0	10
	Hold	1	0	3	3	3	10
	Sell	0	0	0	1	1	2
Category 3	Buy	0	0	1	0	0	1
	Hold	0	1	0	0	1	2
	Sell	0	1	0	0	0	1
Category 4	Buy	0	0	0	0	0	0
	Hold	1	1	3	1	1	7
	Sell	1	0	1	6	4	12
Total		17	15	19	26	21	98

dence here is that this is more likely to arise where non-accounting information is being used. In contrast, accounting-based opinions are more reliably associated with analysts' overall opinions, and where there are conflicting messages in the analyst's report, which may confuse rather than assist the reader (as reported in a similar context by Smith (1993), greater weight should be assigned to the accounting-based signal.

This importance for accounting-based information is reinforced further in Table 7, which tests the validity of the findings reported so far by comparing the outcome of Table 6 with analysts' recommendations. There is an implicit assumption being made here, which must be acknowledged. In an efficient market, a company's share price, against which an analyst's recommendation is made, embodies a given information set, for example, publicly-available information in the case of semi-strong form efficiency. If an analyst is making a recommendation, then he or she is implicitly declaring a state of inefficiency, at least with respect to the information on which the analyst is recommending the trade. The assumption being made in Table 7 is that the analyst's positive or negative statements with respect to earnings quality correspond to his or her views on information that is not impounded in the share price, and which is therefore the basis of the recommendation. This is a fairly strong assumption but not an unreasonable one. After all, if the analyst is making the case to buy or sell, then he or she will stress the reasons for this in the report on the company and, consistent with the theory and evidence outlined in Section 2, earnings quality is likely to be a major focus.

Like other studies (Bradshaw, 2002; Demirakos et al., 2004), Table 7 reports a dominance of positive recommendations, which is again consistent with an underlying bias in favour of companies (there are slightly more than three times as many buy recommendations as sells). There is a strong relationship between buy recommendations and analysts being positive on both accounting-based and non-accounting-based information relating to earnings quality and, similarly, between sell recommendations and negative/negative. For example, out of 53 Category 1 reports, an overwhelming majority of reports (45 reports) had positive recommendations and only two had negative recommendations; similarly, there were no buy recommendations in Category 4. This evidence is reassuring because it is consistent with earnings quality as defined in this paper being decision-relevant (i.e. the concept of earnings quality as described by analysts in the interviews, and as then measured in the content analysis of reports by those analysts is indeed consistent with the investment recommendations made by the analysts).

Category 2 is noteworthy because it provides some exception to the rule. The evidence is that if accounting-based information on earnings quality is positive, then when it comes to a recommendation the analyst is unlikely to propose a sell, even if reservations based upon non-accounting information are expressed. This suggests that when analysts are positive on the basis of accounting data, they tend to provide at least neutral recommendations and hardly any negative recommendations. The reverse is not true. When negative accounting-based information dominates (i.e. 23 reports in Category 3 and 4), only one report had a positive recommendation and 13 reports had negative recommendations.

As reported in Panel A of Table 8, we fitted a logistic regression model to examine the association

between positive accounting dominance (i.e. Category 1 and Category 2) and buy recommendations. Logistic regression is a generalised linear model for binary dependent variables that uses the logit as its link function, and has binomially distributed errors. The model takes the form

$$\text{logit}(p_i) = \log_e(p_i/(1-p_i)) = \beta_0 + \beta_1 x_i \quad (1)$$

where p_i is the predicted probability of Buy for report i given values for the explanatory variable x_i. Model (1) can readily be rearranged to give the following expression for p_i

$$p_i = \exp(\beta_0 + \beta_1 x_i)/\{1 + \exp(\beta_0 + \beta_1 x_i)\}$$

The model parameters $\beta = (\beta_0, \beta_1)$ are estimated by iterative reweighted least squares and are interpreted as effects on the odds ratio. In the case of a dichotomous explanatory factor, with levels A and B, the antilog of the estimated parameter for that factor, $\exp(\hat{\beta}_1)$, is an estimate of the odds-ratio of level A of the factor versus level B. For our dichotomous categories, the model takes the form

$$\hat{p}_i = \frac{\exp(\hat{\beta}_0 + \hat{\beta}_{\text{CAT}\,i})}{1 + \exp(\hat{\beta}_0 + \hat{\beta}_{\text{CAT}\,i})} \quad (2)$$

The predicted probability $\hat{p}$ that analysts will recommend Buy for report i is given by substituting the parameter estimates from Panel A of Table 8 into equation (2). We find, at the 1% significance level, that positive accounting views relating to earnings quality are positively associated with buy recommendations. We infer that when analysts have positive accounting-based views relating to earnings quality, it is likely that they will recommend a buy, irrespective of whether the positive accounting view is expressed alongside either positive or negative non-accounting-based views.

We tested another version of the model to see which category individually best explains analysts' buy recommendations. Consistent with expectations, Panel B reports positive coefficients on Categories 1, 2 and 3. These are statistically significant on Category 1 and 2 at the 1% level, although not significant on Category 3.[13] The odds ratio for Category 1 suggests that the odds of analysts recommending a stock 'buy', having both positive accounting and non-accounting views relating to earnings quality, is 28.6 times higher versus Category 4, as opposed to 17.1 (5.1) times in case of holding positive (negative) views of accounting while simultaneously holding negative (positive) views on non-accounting – all other factors being equal. We infer that more positive accounting and non-accounting views relating to earnings quality should result in more buy recommendations, in particular when the accounting perspective is positive. These findings reinforce further the importance of accounting-based information on earnings quality, which plays a dominant role in analysts' recommendations despite a greater prevalence of non-accounting words and themes in analysts' reports.

[13] The Hosmer and Lemeshow goodness-of-fit test divides reports up into deciles based on predicted probabilities, and then computes a chi-square statistic from observed and expected frequencies. The p-value = 0.432 (chi-square = 8.01) computed for the fitted model of equation (2) indicates that the model fits the data very well.

6. Conclusion

Prior research has evidenced the importance of analysts and financial statement data (notably earnings) in the process of share price determination. There is relatively little evidence, however, on analysts' interpretation and use of earnings data. Combining survey research and content analysis, this paper contributes to the literature in this area by focusing on analysts' perceptions of earnings quality. It is shown that these perceptions are determined by both accounting and non-accounting information. Consistent with theory and prior evidence, analysts' primary concern regarding accounting-based information is to derive a measure of sustainable earnings. It is striking, however, that references to earnings quality in analysts' reports are more often based upon non-accounting information. This is especially the case when a directional opinion (positive or negative) is being expressed.

Prior research suggests that analysts' economic incentives lead them to introduce news to the market in order to generate commission income and to show a favourable bias towards companies. Analysts are therefore drawn towards making greater relative use of non-accounting-based information, because it is inherently subjective and more amenable to variation in opinion and to the generation of news. When using accounting-based information, analysts are particularly sparing in their use of negative references to earnings quality, because these are more readily verifiable and demonstrably inconsistent with analysts' inherent bias in favour of companies. Overall therefore, positive and non-accounting-based references to earnings quality are most common, which is evidence that analysts use information opportunistically.

It is shown, however, that the greater prevalence of non-accounting-based information does not suggest that such information dominates analysts' perceptions of earnings quality, but rather that the reverse is the case. First, when accounting and non-accounting information provide conflicting signals with regards to earnings quality, it is the accounting-based view that provides the dominant signal. Specifically, where analysts are positive on

Table 8
Parameter and estimates for the model of equation (2)

Panel A: Association between positive/negative accounting dominance and Buy recommendations

Model	*Term*	*Estimate*	*SE*	*t-ratio*	*exp(Estimate)*
$\hat{\beta}_0$	Constant	–0.262	0.421	–0.62	0.7692
$\hat{\beta}_{CAT}$	Positive accounting dominance (Category 1 and Category 2)	2.901**	0.623	4.66	18.20

** Significant at 1% level
Model χ^2 =25.244, p = 0.000

Panel B: Association between four individual categories and Buy recommendations

Model	*Term*	*Estimate*	*SE*	*t-ratio*	*exp(Estimate)*
$\hat{\beta}_0$	Constant	–0.539	0.476	–1.13	0.5833
$\hat{\beta}_{CAT}$	[Category 1]	3.352**	0.754	4.44	28.56
	[Category 2]	2.842**	0.88	3.23	17.14
	[Category 3]	1.64	1.25	1.31	5.143

**Significant at 1% level
Model χ^2 = 27.508, p = 0.000

accounting aspects of earnings quality, they are 'free' to be either positive or negative on non-accounting aspects, but that if they are negative on accounting aspects, then they are, in effect, constrained to be negative overall. Second, when making investment recommendations, it is again the accounting-based signal that is dominant. If analysts are positive on accounting-based information they are very unlikely to recommend a sell, regardless of whether their non-accounting-based view is positive or negative. Yet if their accounting-based view is negative, they are effectively unable to recommend a buy. Overall, accounting-based information is argued to be more important than it might at first seem, because while it is not dominant in its frequency of usage, it is dominant in its impact on the analyst's overall assessment of earnings quality.

This paper raises several questions for future research. First, while the paper identifies bias in analysts' research, which affects the relative usage of accounting-based and non-accounting-based information in research reports, an open question is how investors respond to this information – for example, do they understand analysts' inherent bias and so compensate for it, or are they misled? Second, while the presentation of financial statements is audited and driven by the requirements of accounting standards, the relative freedom with which companies present non-accounting information serves to feed analysts' more liberal usage of the same. A question therefore is whether greater standardisation and audit in the reporting of non-accounting information would reduce bias in analysts' research reports. Third, the paper reports remarkable stability in the relative importance of accounting-based vs non-accounting-based information across sectors, which stands in contrast with inherent variation in the usefulness of accounting information, and which therefore warrants further investigation. Finally, while the paper provides evidence on analysts' adjustments to reported earnings, which supports prior evidence on the importance of the PE valuation model, it remains to be explored how, in practice, adjusted earnings are used in the forecasting of future earnings, how subjective notions of earnings quality feed into this process and how non-accounting-based information is used to supplement accounting-based information.

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Taxation of shareholder capital gains and the choice of payment method in takeovers

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Abstract—From December 1999, shareholders who disposed of shares in Australian takeovers in exchange for scrip could elect to defer capital gains taxation until the disposal of the shares received. We investigate payment method choice by acquiring firms before and after this regulatory change to assess whether target shareholder capital gains tax liabilities became an important factor considered in choosing the form of payment. The results show that, subsequent to the regulatory change, there is a significantly higher probability that equity will be offered as consideration where target shareholder capital gains are greater. This finding confirms the importance of shareholder level taxation in explaining corporate acquisition structure and adds to previous European and US evidence on factors associated with payment method choice in takeovers.

Keywords: capital gains taxation; mergers and acquisitions; method of payment

1. Introduction

The association between shareholder level taxation and the structure of corporate takeovers has received a great deal of attention in prior research. In the UK, where equity is received as payment in a takeover, section 135 of the *Taxation of Chargeable Gains Act 1992* allows target firm shareholders to defer any capital gain to the subsequent disposal of the acquiring firm's shares. In contrast, where payment is received as cash, target shareholders are immediately taxable on any capital gain.[1] Similar taxation arrangements exist in the US under section 368 of the Internal Revenue Code. The immediate taxable status where cash is offered as payment has led to the expectation (Erickson, 1998 and Dinnison, 2000) that acquiring firms will be less likely to use cash where target shareholders have a greater liability for capital gains tax (CGT). However, previous studies in Europe (Faccio and Masulis, 2005) have been unable to find any association between the choice of payment method and the taxation treatment of target shareholders. Similarly, US studies have found no association between the acquiring firm's method of payment choice and proxies for the size of target shareholder capital gains (Erickson, 1998; Ayers et al., 2004). Ayers et al. (2004) do, however, document a greater use of equity payment during periods of higher CGT rates in the US but find no association with proxies for the size of target shareholder capital gains.

In contrast to the US and UK and prior to 10 December 1999, in Australia the *Income Tax Assessment Act 1997* imposed an immediate CGT liability on shareholders who disposed of their shares in response to a takeover offer irrespective of the type of consideration received. From 10 December 1999, however, target shareholders have been permitted to elect to defer the payment of CGT when equity is received as part of a takeover offer until the subsequent disposal of those shares. This change in regulatory environment provides a unique opportunity to test whether there is a shift in the structure of corporate acquisitions in response to a modification in the taxation treatment of shareholders. Specifically, this study examines the relationship between target shareholder capital gains and the method of payment choice before and after this change in the regulatory environment. For takeovers announced during the earlier regime, we expect to find no association between the choice of payment method and shareholder capital gains. Subsequent to 10 December 1999, however, we expect to find that the probability that target shareholders are offered equity as consideration will increase with the level of target shareholder capital gains. To test this hypothesis,

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[1] A discussion of the UK capital gains treatment of target firm shareholders is available in HM Revenue and Customs Help Sheet IR285: 'Share Reorganisations, company take-overs and capital gains tax' available at: http://www.hmrc.gov.uk/helpsheets/IR285.pdf.

we use two measures to approximate target shareholder capital gains. Consistent with prior research in the US (Erickson, 1998; Ayers et al., 2004) the first proxy measures capital gains as the share price 20 days prior to the takeover announcement less the average share price over the prior two years. The second estimate of capital gains is calculated as the difference between the share price 20 days prior to the takeover announcement and the share price two years previous. This capital gain is then either indexed for inflation or a capital gains discount of 50% allowed under section 115-100 of the *Income Tax Assessment Act 1997*.

For the first measure of target shareholder capital gains our results show that, after the introduction of CGT rollover, there is a significant reduction in the probability that cash and mixed payment forms will be offered as consideration in takeovers with higher estimated target shareholder capital gains. The second measure of capital gains, however, provides insignificant results. When we re-estimate our results only for target firms where the estimated holding period is between zero and three years, we obtain significant results indicating a shift from cash to equity payment for takeovers with higher target shareholder capital gains for both proxies of target shareholder capital gains. For mixed payment forms, however, the results still only remain supportive of our hypothesis using the first capital gains measure. Our findings significantly contribute to the literature as it is the first study that documents a significant association between proxies for the size of target shareholder capital gains and the choice of payment method. This study thus provides evidence on the importance of shareholder level taxation for the acquisition structure of publicly listed firms. This finding also adds to the factors that have been shown in prior studies to explain payment method.

This paper also extends our knowledge as it is the first to examine comprehensively the method of payment choice by Australian acquirers. As such, the study provides evidence on whether similar factors determine payment form as previously documented in Europe and the US. The findings show that an acquiring firm is more likely to offer cash or a mixed payment form when it has a higher free cash flow or a greater toehold stake in the target firm. Furthermore, target firms with a higher market-to-book ratio are more likely to be offered equity payment, consistent with the presence of information asymmetry and a greater uncertainty over the expected synergy that will arise from the takeover. The results also indicate that mixed payment forms are offered more frequently in friendly takeovers and to target firms of greater size.

The remainder of this study is organised as follows. The next section describes the taxation treatment of capital gains in Australia and summarises prior research relevant to this study. Section 3 develops the model tested in the paper, whilst Section 4 describes the sample and presents results. The final section of the paper discusses conclusions and possible areas of future research.

2. Regulation and prior literature

2.1. Taxation of capital gains on share disposals in Australia

The *Income Tax Assessment Act 1997* is the main legislative authority on taxation in Australia with the treatment of capital gains addressed in Chapter 3 of the Act.[2] Under this Act, the disposal of shares acquired after 19 September 1985 results in the shareholder generating a taxable capital gain or loss (section 104-10). Shares acquired prior to this date are not subject to CGT when sold. Any capital gain generated on disposal of the shares is taxable at the shareholder's marginal tax rate, whilst realised capital losses can only be offset against current or future capital gains (section 102-5). For shares acquired on or before 21 September 1999, the capital gain is calculated after indexing the cost of the shares for inflation with the proviso that the shares have been owned for more than 12 months (section 114-1). However, indexation is not available where the shareholders realise a capital loss (section 114-5). Furthermore, subsequent to 21 September 1999, section 114-1 indicates that indexation is no longer available at all. For investments purchased prior to 21 September 1999, indexation has been frozen at the indexed cost measured on 30 September 1999. Replacing the indexation system, shareholders who dispose of their investment after 21 September 1999 are permitted to discount the capital gain if at the time of disposal they held the shares for more than 12 months (section 115-100). The rate of the discount is 50% for individuals and trusts and 33⅓% for superannuation funds and life insurance companies (section 115-100). Shareholders who acquired their interest prior to 21 September 1999 may choose to take the CGT discount or use the frozen indexed cost of the shares when calculating their taxable capital gain (section 114-5).

Prior to 10 December 1999, target shareholders in Australian takeovers were required to pay CGT on shares sold into a takeover irrespective of the form of consideration received. As a result, target shareholders who received equity as consideration were immediately liable to pay CGT. This outcome is in contrast to the UK and US legal environment, which allows shareholders who receive equity as payment in a takeover to defer the taxation until the ultimate sale of the shares received. From 10 December 1999 onwards, target share-

[2] The *Income Tax Assessment Act 1997* is available at: http://law.ato.gov.au/atolaw/index.htm.

holders who, as part of an Australian takeover, exchange the same type of interest (i.e. shares exchanged for shares, or a trust interest for another trust interest) can elect to roll over any capital gain until the ultimate disposal of the interest received as takeover consideration. This election is only available to shareholders if the acquiring firm at the completion of the takeover acquires an ownership interest in the target of at least 80% (sections 124-780 and 124-781). Where target firm shareholders are offered both cash and equity, they can only partially roll over the capital gain.[3]

The roll-over of CGT was introduced because the previous provisions 'were considered an impediment to corporate acquisition activity in Australia'[4] and followed numerous calls from interest groups for taxation reform. For example, a representative of the Securities Institute of Australia, commenting on the taxation of target shareholders who receive scrip under a takeover offer stated, 'not all takeovers add value, but restricting them in this way must be damaging our economy generally' (Main, 1999: 23). It was expected that, subsequent to the reforms, there would be an increase in the use of scrip as payment in takeovers (Dinnison, 2000).

2.2. Shareholder taxation and corporate acquisition structure

Given the immediate taxation of shareholder capital gains where cash is accepted as payment, previous US and European research has investigated if there is a negative association between the use of cash consideration and target shareholder capital gains. Faccio and Masulis (2005) find no association between the method of payment choice in Europe and any target shareholder tax advantage from stock payments. Similarly, Erickson (1998) finds the payment form in the US is unrelated to estimates of the size of target shareholder capital gains. Similar results are reported for the US in Auerbach and Reishus (1988) and Ayers et al. (2004). This later study also examines the method of payment choice over five different CGT regimes in the US. Consistent with shareholder level taxation being an important determinant of acquisition structure, they show that the use of equity payment (i.e. a tax-free acquisition) is greatest in those periods with the highest CGT rates. This association is found to increase with the size of target institutional ownership, consistent with institutions preferring tax deferred consideration. Reporting results from the UK, Franks et al. (1988) find that the proportion of cash-financed acquisitions decreased only over the immediate period after the introduction of capital gains taxation. In a different context, Dhaliwal et al. (2004) find evidence of a higher acquisition price in the purchase of US hospitals where the seller has a greater taxation liability.

3. Factors influencing payment form and empirical method

As bidding firms in a takeover can offer three types of consideration (i.e. cash, equity or mixed payment), we use three variants of a binomial logit model to examine the association between the target shareholder capital gains and the payment method. For the purposes of this study, mixed payment forms are defined as takeovers where shareholders are offered cash and equity as payment or a choice between cash and equity payment. We first compare cash and equity takeovers with the dependent variable (*PAYT*), indicating takeovers where the payment form is exclusively cash (model 1a). In the second variation of the model (model 1b), mixed and equity takeovers are included with *PAYT* denoting takeovers with mixed payment forms. In both these iterations of the model, we expect to find that, subsequent to the introduction of CGT rollover relief there will be an increased probability of equity payment being offered where target shareholders have higher capital gains. The final iteration of the model is estimated with cash and mixed bids with *PAYT* signifying cash takeovers (model 1c). As shareholders in mixed bids are still liable to pay taxation on capital gains relating to the cash component, it is unclear as to whether there will be a shift from pure cash offers to mixed payment forms after the regulatory change.

The independent variables in the payment choice model include tax variables and other controls that have been shown in prior research to influence the method of payment choice. These variables have been grouped broadly into the following categories: taxation-related, target and acquiring firm-related and takeover offer characteristics.

3.1. Taxation-related variables

Target shareholder capital gains are estimated over the two-year period prior to the takeover announcement. Consistent with Erickson (1998) and Ayers et al. (2004), target shareholder capital gains (*CGN20*) are estimated as the share price 20 days prior to the takeover announcement minus the average share price over the prior two years. We also use an alternative measure of the capital gain (*CGNINDEX*) that is calculated for takeovers announced on or before 21 September 1999 by indexing the assumed acquisition cost for inflation. For this purpose, we assume all target sharehold-

[3] The original cost of the shareholding needs to be apportioned to work out the taxable capital gain that relates to the cash component of the consideration.

[4] 'Capital gains tax: scrip for scrip roll-over – questions and answers' – http://www.ato.gov.au/print.asp?doc=/content/18438.htm.

ers purchased their shares two years prior to the announcement date.[5] For the period after 21 September 1999, the estimated capital gain is discounted by 50%. These two measures of target shareholder capital gains will capture any general association between the payment method choice and the size of target shareholder gains.

An interaction variable is employed in the model to determine any impact of the change in taxation arrangements on the form of consideration offered (*CGN20*CHANGE* and *CGNINDEX*CHANGE*). This variable interacts respectively each measure of capital gains with a dummy variable (*CHANGE*) that denotes takeovers announced on or after 10 December 1999. It is hypothesised that this interaction variable will have a significant negative coefficient in models (1a) and (1b). To highlight if the change in capital gains taxation resulted in a shift in payment form that is unrelated to the size of target shareholder capital gains, *CHANGE* is also included in the models.

In Australia, corporations that make a loss for tax purposes do not receive a refund but are entitled to carry forward the loss to offset against taxable income in future years. The deduction of prior year losses is subject to passing either a 'same business test' or a 'continuity of ownership' test (sections 165-5 of the *Income Tax Assessment Act 1997*). The 'continuity of ownership' test requires that shares carrying more than 50% of voting, dividend and capital rights be owned by the same shareholders from the start of the financial year that the tax loss was incurred to the end of the financial year that the loss is to be offset against taxable income. The 'same business test' requires that the entity is carrying on the same business in the claim year as it was at the start of the loss year. As shown in Erickson (1998), where the acquirer has a carry forward tax loss, the firm is less likely to value further interest deductions and, as such, it is less likely to offer cash as payment. Ayers et al. (2004), however, find that losses do not explain payment choice. Carry forward tax losses are collected from the acquiring firm's financial statements for the year-end prior to the takeover announcement. Similar to Ayers et al. (2004), *NOL* is defined as the carry forward tax loss multiplied by the applicable corporate tax rate, divided by the acquiring firm's market value of equity at the financial year-end before the takeover announcement. This variable is hypothesised to have a negative coefficient.

As institutional investors generally have lower tax rates than other shareholders, the amount of CGT payable will be less than for individual shareholders.[6] Accordingly, the demand for tax-deferred consideration is expected to decrease at higher levels of target institutional ownership. Ayers et al. (2004), however, find that the use of equity payment is positively associated with the ownership of institutions in the target firm. Institutional ownership in the target firm is estimated from the Top 20 shareholder list released at the financial year-end prior to the takeover announcement (*TGTINST*).[7] The model also includes an interaction variable between *TGTINST* and the change in CGT treatment (*TGTINST*CHANGE*). This interaction variable measures whether the relationship between target institutional ownership and the payment method changes in the period after 10 December 1999. For example, if institutional owners are able to pressure bidding firms to offer tax-deferred consideration, it is expected that target firms with greater institutional ownership will be more likely to be offered equity payment after the change in taxation arrangements.

3.2. Target and acquiring firm characteristics

The financial condition of the bidder will influence payment choice. Acquisitions financed through cash typically require firms to obtain additional debt finance. The ability of the acquiring firm to support further debt will depend on the bidder's current leverage and cash-flow, as well as the financial condition of the target. Where the bidder can gain access to target free cash flow or target unused debt capacity, it has a greater ability to finance the acquisition with cash. As predicted, Faccio and Masulis (2005) find that greater leverage increases the use of equity payment for European bidders. Mayer and Walker (1996) and Martin (1996), however, find leverage does not explain payment method choice in the US.[8] In fact, Mayer and Walker (1996) and Martin (1996) document that, in the US, the use of cash is positively related to proxies for bidder firm free cash flow. Free cash flow for the acquiring (*BIDFCF*) and target firm (*TGTFCF*) is measured as cash flow from operations less dividends paid, scaled by total assets as reported for the financial year prior to the takeover announcement. Leverage is measured using the debt-to-equity ratio for the target (*TGTDE*) and bidding firms (*BIDDE*) calculated at

[5] Consumer price index inflation data is available at the Australian Bureau of Statistics website: http://www.abs.gov.au/.

[6] The current maximum income tax rates in Australia are 47% for individuals, 30% for companies and trusts and 15% for complying superannuation funds. Sourced from the Australian Taxation Office at: http://www.ato.gov.au/businesses/pathway.asp?pc=001/003/019&mfp=001/003&mnu=601#001_003_019.

[7] Similar to Henry (2005), we define institutional shareholders as: life and non-life insurance companies, fund management companies, banks, superannuation funds and investment companies. Nominee shareholdings are not included unless it is indicated that they are institutional accounts.

[8] Chaney et al. (1991) and Erickson (1998) find US acquirers with higher leverage use cash, consistent with an attempt to maintain their existing capital structure.

the end of the financial year before the takeover announcement. It is expected that the probability of cash being offered will be positively related to the target and the acquiring firm's free cash flow, whilst negatively associated to the target and the bidding firm's leverage.

The cost of debt financing will influence the ability and attractiveness of making an acquisition using cash. It is expected that in periods of relative high interest rates, bidding firms will prefer to finance an acquisition using equity. The cost of corporate borrowing is proxied using the indicator lending rate for the month of the takeover announcement (*IRATE*) sourced from the Reserve Bank of Australia Indicator Lending Rates.[9]

Bidders with higher levels of insider ownership have been found in the US to make greater use of cash financing to avoid diluting the ownership rights of existing shareholders (Amihud et al., 1990; Mayer and Walker, 1996; Yook et al., 1999). Faccio and Masulis (2005) find that insider ownership in Europe is only related to the use of cash payment at medium levels of insider ownership. The potential for dilution of ownership to explain payment form is measured using the percentage holding of executive and non-executive directors on the board at the time of the takeover announcement (*BIDDIROWN*). This variable is predicted to have a positive coefficient.

Consistent with the arguments of Myers and Majluf (1983), prior research has found that bidders offer equity where the firm's stock is overvalued (e.g. Faccio and Masulis, 2005 in Europe; Da Silva Rosa et al., 2000 in Australia; Mayer and Walker, 1996; Martin, 1996; Erickson, 1998; Emery and Switzer, 1999; and Ayers et al., 2004 in the US). Overvaluation is measured using the acquiring firm's market-to-book ratio (*BIDMB*) calculated at the financial year-end prior to the takeover announcement. We expect this variable to have a negative coefficient in the regression model. Faccio and Masulis (2005) provide an alternative explanation for a negative association between an acquiring firm's market-to-book ratio and cash payment. They argue that this finding is consistent with acquiring firms with greater growth prospects having greater stock attractiveness as merger consideration.

The models of Hansen (1987) and Fishman (1989) argue that, where there is greater information asymmetry regarding the value of the target, equity is more likely to be offered as payment. Similarly, an acquirer is more likely to offer equity where they are uncertain as to the potential synergy that may arise from a takeover. Information asymmetry has been proxied in previous research using the absolute size of the target, as well as the relative size of the target to the bidder. In Australia and Europe, as predicted, Da Silva Rosa et al. (2000) and Faccio and Masulis (2005) respectively find that a larger relative size is associated with more frequent use of equity payment. In contrast, the relative size of the target to the bidder has generally been found to be insignificant in explaining payment choice in the US (see Martin, 1996; Mayer and Walker 1996; and Emery and Switzer 1999). We proxy for information asymmetry and uncertainty over the value of the target by including the following variables in the payment choice model: target firm size (*TGTSIZE*), target market-to-book ratio (*TGTMB*) and the relative size of the target to the bidder (*RELSIZE*). Each variable is measured at the financial year-end prior to the takeover announcement. Size is measured using the natural logarithm of the target firm's market capitalisation. All three variables are expected to have a negative coefficient in the payment choice model.

When the bidder has a greater initial toehold stake in the target, the consideration required to finance the acquisition from current cash reserves decreases. It is expected, therefore, that the toehold stake will be positively related to the likelihood of a cash bid. The toehold interest (*TOEHOLD*) of the acquiring firm in the target at the time of the takeover announcement is added to the payment choice model.

3.3. Takeover offer characteristics

Fishman (1989) and Mayer and Walker (1996) argue that cash is used as payment to obtain a competitive advantage in the bidding process. Where the takeover is hostile and/or there is an expectation that competing bidders may enter into a bidding contest, it is important that the takeover be completed quickly. Consistent with this expectation, Mayer and Walker (1996) and Ayers et al. (2004) find that cash is used more frequently in US hostile takeovers,[10] whilst Erickson (1998) reports that a cash offer is more probable in the US where there are multiple acquirers. Faccio and Masulis (2005), however, find that takeover hostility does not explain payment choice in Europe. Target firm hostility and the presence of multiple bidders are controlled using binary variables. *DIRREC* is a variable denoting takeovers where the initial recommendation of the target board is to recommend acceptance, whilst *MULTIPLE* indicates takeovers where competing bidders exist for the target firm. Both variables are predicted to have positive coefficients.

The complete logit regression model of method of payment choice is as follows:

[9] Available at: http://www.rba.gov.au/Statistics/

[10] The use of cash accelerates the process as acquiring firm shareholders in the US need to approve the issue of stock in equity bids.

$$PAYT_i = \alpha_i + \beta_1 CGN_i + \beta_2 CGN{*}CHANGE_i + \beta_3 CHANGE_i + \beta_4 NOL_i + \beta_5 TGTINST_i + \beta_6 TGTINST{*}CHANGE_i + \beta_7 TGTDE_i + \beta_8 BIDDE_i + \beta_9 TGTFCF_i + \beta_{10} BIDFCF_i + \beta_{11} BIDDIROWN_i + \beta_{12} BIDMB_i + \beta_{13} TGTMB_i + \beta_{14} TGTSIZE_i + \beta_{15} RELSIZE_i + \beta_{16} TOEHOLD_i + \beta_{17} IRATE_i + \beta_{18} DIRREC_i + \beta_{19} MULTIPLE_i + \varepsilon_{it} \quad (1)$$

The model of payment method choice is estimated separately for cash versus equity takeovers (1a), mixed versus equity takeovers (1b) and cash versus mixed takeovers (1c) using in turn each of the two estimates of target shareholder capital gains (i.e. *CGN* is, in turn, *CGN20* and *CGNINDEX*). Table 1 provides a summary of the variable definitions and measurement in addition to indicating the predicted signs of the coefficients.

4. Data and results

The Connect 4 Mergers and Acquisitions Database was used to identify 435 takeovers announced on the Australian Stock Exchange (ASX) during the period 1996–2003. As capital gains roll-over is only available where the bidder firm acquires at least 80% ownership in the target (sections 124-780 and 124-781 of the *Income Tax Assessment Act 1997*), we restricted the search criteria to takeovers for 100% of the target shares when initially selecting takeovers to be analysed. Additionally, we excluded takeovers where the consideration offered an exchange of non-equivalent interests (e.g. shares for a trust interest). This period encompasses approximately four years pre- and post-introduction of roll-over relief for equity exchange takeovers. Over this timeframe, there was no adjustment to the highest individual marginal tax rate (i.e. 47%). The data required to estimate the regression model (1) was obtained from a number of sources and is summarised in Table 1. Annual reports for bidder and target firms in the year preceding the takeover were used to hand collect accounting information and institutional ownership. Huntley's Aspect FinAnalysis database was used as the source of annual reports. Takeover documents lodged with the ASX were used to collect information on: method of payment, the ownership interest of acquiring firm directors, the recommendation of the target firm board, the toehold interest of the acquiring firm and the presence of competing bidders. Takeover documents were sourced from the Connect 4 Mergers and Acquisitions Database and the Securities Industry Research Centre of Asia-Pacific (i.e. SIRCA) TIFF Images of ASX announcements. Share price data and the average daily trading volume of target firms were collected from the Core Research Database maintained by SIRCA.

To ensure a complete data set was available to estimate the regression model, we excluded those takeovers with missing observations for one or more of the variables. Details of the reasons for the exclusion of takeovers are summarised in Table 2. The main reason for deleting observations lies in the bidding firm's lack of public listing in Australia. After removing takeovers with missing information, we were left with 194 takeovers, which are then used to estimate the payment choice model. This group of takeovers includes both completed and unsuccessful takeover bids, with approximately 65% of takeovers successful.

Table 3 shows the distribution of payment method across the observation period. As hypothesised, there is a reduction in the use of cash payment after the legislative change from 51% to 49% of takeovers and an increase in pure equity payment from 31% to 33% of takeovers. However, z-statistics indicate that this change is insignificant. It is also notable that, contrary to expectations, the percentage of acquiring firms using cash increases from 36% in 1999 to 49% in 2000.

Descriptive statistics across payment method for the non-tax variables included in model (1) are provided in Table 4. As expected, bidding firms are more likely to offer equity when the target and acquirer have lower free cash flow. The toehold interest in cash and mixed takeovers are significantly higher than for equity bidders, indicating that bidders are more likely to offer cash (either in whole or part) when the total amount of consideration to be paid is lower. Target firm size is significantly related to payment method with larger firms more likely to be offered mixed consideration followed by cash payment. Inconsistent with the result in Erickson (1998), we find no association between payment method and competing bidders for the target. Target firm leverage does not influence the payment method offered, despite cash bidders having a significantly higher level of indebtedness than equity bidders. Where the target firm board recommends takeover acceptance, the bidding firm is more likely to offer mixed consideration. The results for ownership of acquiring firm directors are inconsistent with expectations as acquiring firms offer equity when directors own a higher percentage of the firm.

In the final row of Table 4, Panel A, we present statistics on the average holding period of target firm shares calculated by dividing the number of issued shares at the time of the takeover announcement by the average daily trading volume over the prior two years (*HOLDPER*). The average holding period does not differ across payment type and ranges between two and three years. This finding indicates that estimating target shareholder

Table 1
Variable definitions and sources

This table provides definitions of the variables used in this study and indicates the source of the data. Share price data was obtained from the SIRCA Core Research database (*SIRCA CRD*). Accounting information and institutional ownership were collected from target and bidding firm annual reports sourced from Huntley's FinAnalysis database (*FinAnalysis*). Information on takeover characteristics and the date of takeover announcements were collected from documents lodged by the target and bidding firms with the ASX. These documents were sourced from either the Connect 4 Mergers and Acquisitions Database (*Connect 4*) or SIRCA Tiff Images of ASX Announcements (*SIRCA ANN*).

Dependent variable	Definition	Data source
PAYT	A binary variable denoting the method of payment. In model (1a) (cash versus equity) and model (1c) (cash versus mixed), the dependent variable denotes takeovers where cash is offered as consideration. In model (1b) (mixed versus equity), the dependent variable denotes takeovers where a mixed payment form is offered.	Connect 4 SIRCA Ann

Independent variable	Definition	Predicted sign	Data source
CGN20	The capital gain of target shareholders calculated as the share price 20 days before the takeover announcement less the average price over the prior two years, divided by the average share price over the prior two years.	?	SIRCA CRD
CGNINDEX	The capital gain of target shareholders calculated as the share price 20 days before the takeover announcement minus the share price two years prior. For takeovers before the introduction of CGT roll-over, the capital gain is calculated after indexing the assumed purchase price. For subsequent takeovers, the capital gain is multiplied by the capital gains discount of 50%. The calculated capital gain is divided by the share price two years prior to the takeover announcement.	?	SIRCA CRD Australian Bureau of Statistics Consumer Price Index series
*CGN20*CHANGE*	*CGN20* multiplied by a dummy variable coded as 1 for takeovers announced on or after 10 December 1999.	–	Connect 4 SIRCA Ann SIRCA CRD
CGNINDEX CHANGE*	*CGNINDEX* multiplied by a dummy variable coded as 1 for takeovers announced on or after 10 December 1999.	–	Connect 4 SIRCA Ann SIRCA CRD Australian Bureau of Statistics Consumer Price Index series

Table 1
Variable definitions and sources *(continued)*

Independent variable	Definition	Predicted sign	Data source
CHANGE	a dummy variable coded as 1 for takeovers announced on or after 10 December 1999.	?	Connect 4 SIRCA Ann
NOL	the carry forward tax loss of the acquiring firm at the financial year-end prior to the takeover announcement, multiplied by the corporate tax rate and divided by market capitalisation at the financial year-end prior to the takeover announcement.	–	FinAnalysis SIRCA CRD
TGTINST	the institutional ownership in the target firm at the financial year-end prior to the takeover announcement estimated from the Top 20 shareholders' list.	+	FinAnalysis
*TGTINST*CHANGE*	*TGTINST* multiplied by a dummy variable coded as 1 for takeovers announced on or after 10 December 1999.	–	FinAnalysis Connect 4 SIRCA Ann
TGTDE	the target firm debt-to-equity ratio calculated at the financial year-end prior to the takeover announcement.	–	FinAnalysis
BIDDE	the bidder firm debt-to-equity ratio calculated at the financial year-end prior to the takeover announcement.	–	FinAnalysis
TGTFCF	the target firm free cash flow calculated as cash flow from operations less dividends scaled by total assets. Measured at the financial year-end prior to the takeover announcement.	+	FinAnalysis
BIDFCF	the bidder firm free cash flow calculated as cash flow from operations less dividends scaled by total assets. Measured at the financial year-end prior to the takeover announcement.	+	FinAnalysis
BIDDIROWN	the percentage holding of bidding firm directors at the date of the takeover announcement as disclosed in takeover documents lodged with the ASX.	+	Connect 4 SIRCA Ann
BIDMB	the bidder firm market-to-book ratio calculated at the financial year-end prior to the takeover announcement.	–	FinAnalysis SIRCA CRD
TGTMB	the target firm market-to-book ratio calculated at the financial year-end prior to the takeover announcement.	–	FinAnalysis SIRCA CRD
TGSIZE	the target firm size measured as the natural logarithm of market capitalisation measured at the financial year-end prior to the takeover announcement.	–	FinAnalysis SIRCA CRD

Table 1
Variable definitions and sources *(continued)*

Independent variable	Definition	Predicted sign	Data source
RELSIZE	the relative size of the target firm to bidder firm calculated by dividing the target firm market capitalisation by the bidding firm market capitalisation. Market capitalisation is calculated at the financial year-end prior to the takeover.	–	FinAnalysis SIRCA CRD
TOEHOLD	the share ownership of the bidder firm in the target firm at the date of the takeover announcement disclosed in the bidding firm's documents lodged with the ASX.	+	Connect 4 SIRCA Ann
IRATE	the average corporate lending rate in the month of the takeover announcement.	–	Reserve Bank of Australia Indicator Lending Rates
DIRREC	a binary variable coded as 1 where the initial recommendation of the target firm board to shareholders is to accept the offer.	+	Connect 4 SIRCA Ann
MULTIPLE	a binary variable coded as 1 if competing takeover offers are announced for the target firm.	+	Connect 4 SIRCA Ann
Other variables			
HOLDPER	the average holding period calculated as the number of target firm shares on issue at the date of the takeover announcement divided by the average daily trading volume over the preceding two years.		Connect 4 SIRCA Ann SIRCA CRD

Table 2
Sample selection

Takeovers announced for ASX listed companies between 1996 and 2003 are included in the sample. The table identifies the reasons for the exclusion of takeovers from the final sample.

Takeovers for ASX listed targets announced between 1996 and 2003	435
Exclusions:	
Bidders not listed on the Australian Stock Exchange	198
Target firm does not disclose required information	8
Offer withdrawn prior to release of target firm statutory documents	21
Target firm has no financial information as it is listed in year of takeover	3
Bidder does not disclose required information	11
Takeovers included in model of payment method choice	194

Table 3
Payment method use and pre- and post-taxation change

This table presents method of payment use pre- and post-change to CGT on 10 December 1999. Cash and equity bids are entirely cash or equity financed. Mixed payment offers provide target shareholders with either a choice of cash or equity or a combination of cash and equity. For each row, the percentage of each payment method is presented in italics.

	Cash	*Equity*	*Mixed*	*Total*
Panel A:				
Pre-tax change				
1996	12	6	4	22
	55	*27*	*18*	*100*
1997	9	6	1	16
	56	*38*	*6*	*100*
1998	18	9	5	32
	56	*28*	*16*	*100*
1999	9	8	8	25
	36	*32*	*32*	*100*
Total	48	29	18	95
	51	*31*	*18*	*100*
Panel B:				
Post-tax change				
2000	19	12	8	39
	49	*31*	*20*	*100*
2001	12	9	3	24
	50	*38*	*12*	*100*
2002	8	8	1	17
	47	*47*	*6*	*100*
2003	10	4	5	19
	53	*32*	*26*	*100*
Total	49	33	17	99
	49	*33*	*18*	*100*

Table 4
Descriptive statistics across payment methods

This table presents means of the non-tax variables included in the logit regression model of payment choice. These variables are expected to influence the method of payment choice of acquiring firms. A univariate test of differences in means across the payment methods is also presented. Variable definitions are provided in Table 1.

	Cash (*n* = 97)	*Mixed* (*n* = 35)	*Equity* (*n* = 62)	*Cash v Equity*	*Cash v Mixed*	*Mixed v Equity*
Panel A: Mean for continuous variables				*t*-test	*t*-test	*t*-test
TGTDE	1.17	1.13	3.82	–0.85	0.15	–0.86
BIDDE	1.19	1.16	0.87	2.19**	0.19	1.33
TGTFCF	3.00	1.76	–4.80	3.01***	0.48	2.19**
BIDFCF	6.11	4.61	–5.16	3.01***	0.50	2.63***
BIDDIROWN	12.31	10.04	18.06	–1.88*	0.65	–2.17**
BIDMB	2.05	1.69	2.31	–0.67	1.33	–1.47
TGTMB	1.82	1.30	1.84	–0.05	1.57	–1.12
TGTSIZE	17.67	18.70	17.06	2.26**	–3.38***	5.02***
RELSIZE	0.34	0.58	1.01	–1.55	–2.10**	–0.98
IRATE	8.80	8.74	8.73	0.65	0.41	0.09
TOEHOLD	20.39	17.46	10.40	3.46***	0.81	1.93*
HOLDPER	671	741	682	–1.02	–1.21	0.97
Panel B: Proportion of binary variables coded as 1				*z*-test	*z*-test	*z*-test
DIRREC	46.39	65.71	46.77	–0.05	–1.96**	1.80*
MULTIPLE	28.87	25.71	17.74	1.59	0.36	0.93

* indicates significance at the .10 level
** indicates significance at the .05 level
*** indicates significance at the .01 level

capital gains in model (1) over the two years prior to a takeover announcement provides a reasonable approximation of the holding period for the average shareholder.

Table 5 provides summary statistics across payment types for the taxation variables incorporated in model (1). Statistics are presented separately for the period before (Panel A) and after the change to CGT (Panel B). Panel C of the table presents a statistical comparison of the variables pre- and post-taxation change. Prior to the introduction of roll-over relief, the results for the non-indexed measure of capital gains indicate that target shareholder capital gains are significantly lower in equity bids than in both cash and mixed bids. Given that shareholders were subject to CGT during this period irrespective of the form of consideration received, this finding indicates that cash or a mixed payment form was being offered to shareholders with higher capital gains for other reasons. One potential explanation is that providing shareholders with at least some amount of cash gives the shareholders a liquid asset with which to pay their taxation liability. In comparison, offering shareholders equity potentially requires the shareholder to sell the shares received to meet their taxation obligations and hence incur transaction costs. Subsequent to the introduction of capital gains roll-over relief, the results for both capital gains measures show that estimated capital gains are higher in cash offers than equity bids. These preliminary findings do not support the expectation that, after the change in regulation, equity would be offered more frequently to shareholders with greater unrealised capital gains. The results also demonstrate no difference in acquiring firm carry forward tax losses across payment types either before or after the change in taxation.

The findings presented in Panel A of Table 5 show that, before December 1999, institutional ownership in the target is significantly lower in equity bids than both other payment types. However, subsequent to the tax change, target institutional ownership in equity bids is no longer significantly different from the other payment forms. Additionally, target institutional ownership in cash takeovers is significantly lower post-change in regulation (see Panel C). These findings suggest that with post-regulation change, there is a move away from cash being used as payment where there is greater institutional ownership in the target firm. This shift in acquisition structure will allow insti-

Table 5
Comparison of tax variables before and after the change to CGT

The table presents descriptive statistics on the tax-related variables included in model (1). Panel A shows statistics pre-change in taxation, whilst Panel B shows statistics post-change in taxation. Both panels also present a *t*-test for differences across payment methods within each time period. Panel C provides a statistical test of differences within the same payment method pre- and post-regulatory change in taxation. *CGN20* is an estimate of target shareholder capital gains calculated as the share price 20 days before the takeover announcement less the average price over the prior two years, divided by the average share price over the prior two years. *CGNINDEX* is an estimate of target shareholder capital gains calculated as the share price 20 days before the takeover announcement minus the share price two years prior. For takeovers before the introduction of the CGT roll-over, the capital gain is calculated after indexing the assumed purchase price. For subsequent takeovers, the capital gain is multiplied by the capital gains discount of 50%. The calculated capital gain is divided by the share price two years prior to the takeover announcement. *TGTINST* is the institutional ownership in the target firm at the financial year-end prior to the takeover announcement estimated from the Top 20 shareholders' list. *NOL* is the carry forward tax losses of the acquiring firm at the financial year-end prior to the takeover announcement multiplied by the corporate tax rate and divided by market capitalisation at the financial year-end prior to the takeover announcement.

	Cash (*n* = 97)	*Mixed* (*n* = 35)	*Equity* (*n* = 62)	*Cash v Equity*	*Cash v Mixed*	*Mixed v Equity*
Panel A: Prior to tax change				*t*-test	*t*-test	*t*-test
CGN20	–2.47	–3.62	–25.51	2.60**	0.14	2.13**
CGNINDEX	12.50	–9.13	–15.21	1.07	1.42	0.24
TGTINST	15.73	16.95	7.58	2.64**	–0.38	2.95***
NOL	1.76	1.00	5.59	–1.51	0.95	–1.42
Panel B: After the tax change				*t*-test	*t*-test	*t*-test
CGN20	3.30	5.52	–12.72	1.92*	–0.19	1.48
CGNINDEX	–0.65	6.43	–22.13	2.27**	–0.34	1.36
TGTINST	6.27	12.34	9.53	–1.14	–2.16**	0.78
NOL	2.89	1.01	3.88	–0.39	1.27	–1.25
Panel C: Pre- vs post-t-test						
CGN20	–0.84	–0.73	–1.27			
CGNINDEX	1.00	–0.71	0.29			
TGTINST	3.79***	1.35	–0.57			
NOL	–0.80	–0.01	0.52			

*** indicates significance at the .01 level
** indicates significance at the .05 level
* indicates significance at the .10 level

tutional investors to roll over (at least in part) their CGT liability to the subsequent disposal of the shares received in the takeover.

A correlation matrix of the independent variables included in the payment choice model is provided in Table 6. As would be expected, there is a high degree of correlation between the two measures of target shareholder capital gains. For the remaining independent variables, there is significant correlation between a number of the variables. The size of the correlation, however, suggests that multi-collinearity is unlikely to be a problem in the estimation of model (1) (Gujarati, 1995: 335–336). The results for target firm size indicate that larger target firms have greater institutional ownership, higher free cash flow and attract a takeover from bidders with larger free cash flow. Acquiring firm director ownership is negatively associated with acquiring firm free cash flow, thereby suggesting an agency problem in acquiring firms (Jensen, 1986). As would be expected, a target firm is less likely to receive competing takeovers when the takeover is friendly and the bidding firm has a higher toehold.

Panel A of Table 7 presents the results of estimating the three variations of model (1) for the complete set of observations. The model is estimated in turn using each of the two measures of target shareholder capital gains. Relative to pure equity takeovers, target shareholder capital gains are found to be significantly higher in both cash bids and mixed bids. This finding is robust to the

Table 6
Correlation coefficients for the independent variables in the payment choice model. Pearson correlations are above the diagonal and Spearman are below

This table presents correlation coefficients between the independent variables included in model (1). *CGN20* is calculated as the share price 20 days before the takeover announcement less the average price over the prior two years, divided by the average share price over the prior two years. *CGNINDEX* is calculated as the share price 20 days before the takeover announcement minus the share price two years prior. For takeovers before the introduction of the CGT roll-over, the capital gain is calculated after indexing the assumed purchase price. For subsequent takeovers, the capital gain is multiplied by the capital gains discount of 50%. The calculated capital gain is divided by the share price two years prior to the takeover announcement. Other variable definitions are provided in Table 1.

	CGN20	*CGN20* CHANGE*	*CGNINDEX*	*CGNINDEX *CHANGE*	*CHANGE*	*NOL*	*TGT INST*	*TGTINST *CHANGE*	*TGTDE*	*BIDDE*
CGN20	1	.568***	.833***	.413***	0.067	–0.110	–0.062	–0.020	–0.006	0.031
*CGN20 *CHANGE*	.667***	1	.421***	.739***	0.040	–0.130*	–0.073	–0.071	–0.022	0.091
CGNINDEX	.879***	.573***	1	.548***	0.049	–0.118	–0.080	–0.033	–0.110	–0.025
*CGNINDEX *CHANGE*	.558***	.829***	.633***	1	–0.121*	–0.102	–0.047	–.154**	–0.012	0.033
CHANGE	.156**	0.037	0.105	–0.074	1	0.009	–.200***	.452***	–0.077	0.003
NOL	–0.103	–0.029	–0.083	0.001	–0.058	1	–0.107	–0.027	.511***	–0.074
TGTINST	–.156**	–0.079	–.191***	–0.095	–.212***	–.192***	1	.486***	–0.039	–0.072
*TGTINST *CHANGE*	0.083	–0.016	0.003	–.170**	.797***	–0.124*	.207***	1	–0.035	–0.034
TGTDE	–0.100	–0.104	–.174**	–0.106	–0.058	–0.055	.186***	–0.016	1	–0.049
BIDDE	–0.005	0.104	–0.024	0.111	0.022	–0.006	0.000	–0.036	.405***	1
TGTFCF	0.118	0.135*	0.072	0.104	–0.050	–0.058	.178**	0.003	.255***	.178**
BIDFCF	0.039	0.048	0.033	0.055	0.062	–0.092	.154**	0.052	.225***	.190***
BIDDIROWN	–.170**	–0.131*	–.190***	–.184**	–0.103	0.083	–.202***	–0.089	0.097	–0.026
BIDMB	0.008	–0.097	0.052	–0.044	0.037	–0.136*	0.094	0.070	0.140*	0.072
TGTMB	.158**	0.089	.232***	.173**	–0.057	0.096	–0.092	–0.033	0.076	–0.045
TGTSIZE	–0.013	0.139*	–0.005	.160**	0.108	–0.113	.449***	.286***	.156**	.177**
RELSIZE	–0.131*	0.000	–0.133*	–0.044	–.142**	0.079	0.059	–0.046	–0.105	–.240***
TOEHOLD	0.073	0.071	0.066	.142**	–0.032	–0.027	–0.094	–0.123*	.170**	.182**
IRATE	.163**	–0.026	0.141*	–0.073	.287***	–0.003	0.047	.259***	0.075	–0.004
DIRREC	0.099	0.052	0.095	0.084	.144**	–0.024	0.005	.142**	0.101	0.123*
MULTIPLE	0.106	0.041	0.082	–0.026	0.054	–.215***	–0.008	0.062	0.102	0.018

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

Table 6
Correlation coefficients for the independent variables in the payment choice model. Pearson correlations are above the diagonal and Spearman are below *(continued)*

	TGTFCF	*BIDFCF*	*BIDDIROWN*	*BIDMB*	*TGTMB*	*TGTSIZE*	*REL SIZE*	*TOE HOLD*	*IRATE*	*DIRREC*	*MULTIPLE*
CGN20	0.057	0.007	–0.096	0.115	0.000	0.057	–0.141*	0.075	0.016	0.045	0.138*
*CGN20 *CHANGE*	0.090	0.035	–0.138*	0.029	–0.025	.173**	–.173**	.219***	–0.006	0.087	–0.006
CGNINDEX	–0.005	–0.017	–0.035	0.070	–0.027	–0.006	–0.111	0.073	0.018	0.055	0.126*
*CGNINDEX *CHANGE*	0.011	0.006	–0.082	–0.078	–0.020	0.069	–.171**	.240***	0.033	0.047	0.017
CHANGE	–0.080	0.059	–0.129*	0.125*	–0.075	.162**	0.019	–0.019	–0.012	.144**	0.054
NOL	–.223***	–.179**	–0.029	–0.066	.523***	–0.129*	.593***	–0.008	–0.083	–0.051	–0.134*
TGTINST	0.132*	0.049	–.178**	–0.052	–0.058	.263***	–0.008	–.143**	0.077	0.023	–0.042
*TGTINST *CHANGE*	–0.002	–0.025	–0.095	0.021	–0.040	.236***	0.026	–0.127*	0.008	0.132*	0.041
TGTDE	–0.131*	–0.054	–0.021	–0.050	.490***	–.152**	–0.003	0.045	–0.058	0.080	–0.042
BIDDE	.180**	–0.107	0.135*	0.091	–0.080	0.079	–0.115	0.128	–0.047	0.091	0.052
TGTFCF	1	.252***	–0.062	–0.015	–.155**	.353***	0.000	.142**	–0.047	–0.043	0.034
BIDFCF	.336***	1	–.173**	–0.055	–0.060	.165**	–0.068	0.079	0.090	–0.125*	0.091
BIDDIROWN	–.145**	–.175**	1	0.107	–0.039	–.308***	0.002	–0.054	–0.128*	0.114	–0.086
BIDMB	0.022	0.134*	0.033	1	–0.047*	0.081*	–0.058**	–0.056	–0.042	0.046	0.020
TGTMB	–0.111	0.108	–0.068	.204***	1	–.141**	–0.004	0.054	–0.068	0.065	–0.059
TGTSIZE	.364***	.261***	–.330***	0.134*	.252***	1	0.034	0.121*	–0.045	0.034	0.052
RELSIZE	0.040	–.257***	.199***	–.177**	0.084	.156**	1	–0.069	–0.093	–0.082	–0.088
TOEHOLD	.163**	0.136*	–0.082	–0.079	0.099	0.005	–0.090	1	0.062	.146**	–.172**
IRATE	–0.085	0.052	–.152**	0.078	–0.001	–0.027	–.146**	–0.009	1	–0.087	0.103
DIRREC	–0.066	–0.085	0.101	0.003	0.064	0.054	–0.086	0.068	–0.008	1	–.311***
MULTIPLE	0.044	0.064	–.173**	0.028	–0.114	0.015	–0.126	–0.136*	0.104	–.311***	1

*** Significant at the 1% level
** Significant at the 5% level
* Significant at the 10% level

measure used to approximate target shareholder capital gains. There is no statistical difference, however, between target shareholder capital gains in cash and mixed bids. These results are consistent with a liquidity explanation: target shareholders with a greater taxation liability require at least some cash to meet this obligation.

The negative coefficient on the interaction variables between target capital gains and the change in the taxation environment indicate a shift to equity from both cash and mixed bids. These results are, however, significant only for the unindexed capital gains interaction variable. This finding provides some evidence that shareholder level taxation is an important determinant of the corporate acquisition structure.

Inconsistent with expectations and prior studies (Erickson, 1998, and Ayers et al., 2004), we find that acquiring firms with greater carry forward losses are more likely to offer cash than both equity and mixed payment. This result is puzzling as it would be expected that firms with carry forward losses would not value the additional deductions associated with the interest payments arising from the debt financing of the takeover. The results show no association between target institutional ownership and the method of payment suggesting that institutional owners do not favour any one payment type. However, confirming the univariate results, the interaction between target institutional ownership and the change in taxation arrangements is significantly negative for model (1a). This finding indicates that acquiring firms were more likely to offer equity than cash after the change in taxation arrangements to target firms with greater institutional ownership. This suggests that bidding firms changed payment structure to allow institutions to roll over capital gains. A similar finding is reported in Ayers et al. (2004). They document a positive association between tax-free acquisitions and target institutional ownership in the US.

For the non-tax variables, the financial condition of the acquiring firm influences the payment method, with cash and mixed payment being used more frequently than equity where bidder free cash flow is higher. This result is similar to that reported in Mayer and Walker (1996) and Martin (1996). In contrast to the results in Faccio and Masulis (2005), leverage is unrelated to the method of payment with both acquiring and target firm debt-to-equity ratios having insignificant coefficients. This result suggests that the level of debt of both the target and acquiring firms at the time of the takeovers is insufficiently high to influence the method of payment choice.

Consistent with the univariate results, mixed payment is more likely to be offered in friendly takeovers and takeovers of larger target firms. Furthermore, a higher relative size of the target firm is significantly associated with a greater use of mixed payment than cash payment. These findings suggest that the target board in these takeovers has greater bargaining power allowing them to obtain a choice of payment for their shareholders. As predicted, a higher acquiring firm toehold significantly decreases the probability of an equity bid. The target firm market-to-book ratio is positively related to the probability of an equity bid, consistent with an information asymmetry explanation. This result is also consistent with greater uncertainty as to potential synergy where the value of a target firm is driven more by growth options than assets-in-place. Competing bidders and the ownership of the acquiring firm board are not associated with payment method. The insignificant coefficient on the acquiring firm market-to-book ratio does not support the argument that overvalued firms will be more likely to offer equity. A potential explanation for this finding is that this variable does not adequately measure acquiring firm overvaluation. Although the coefficient on the prevailing interest rate is negative, it is insignificant in all variants of model (1). A possible explanation for this finding is that, over the period of the study, the corporate interest rate moved in a narrow range between 8% and 10.5%.

A limitation with the estimation of model (1) is that the calculation of capital gains assumes target shareholders have owned their shares for two years. To assess the impact of this assumption, model (1) is re-estimated using only those targets where the calculated holding period is less than three years. This holding period comprises approximately 75% of the sample. These results are presented in Panel B of Table 7. For model (1a), the results on the interaction variable between target capital gains and the change in the taxation environment are now significantly negative using both the indexed and non-indexed capital gains measures. This finding indicates that, subsequent to the regulatory change, acquiring firms were more likely to offer equity than cash to target shareholders with higher capital gains. This result provides additional support for the importance of target shareholder CGT on corporate acquisition structure. The results for model 1(b) remain significant only for the unindexed capital gains interaction variable.

The conclusions on the remaining variables largely remain unchanged from those presented in Panel A for the full set of acquiring firms. Target institutional ownership is now, however, positive and significant in model (1a) indicating that cash is more likely to be offered in takeovers with higher institutional ownership. This result is consistent with institutions having a lower marginal tax rate than individual shareholders. Additionally, the size

Table 7
Results of estimating logit regression model of the method of payment choice

Model (1) examines the impact of the change in CGT arrangements on the payment method used in takeovers. The dependent variable is a binary variable denoting takeovers where the payment method is: exclusively cash (models 1a and 1c) and a mixed payment form (model 1b). *CGN20* is an estimate of target shareholder capital gains calculated as the share price 20 days before the takeover announcement less the average price over the prior two years, divided by the average share price over the prior two years. *CGNINDEX* is an estimate of target shareholder capital gains calculated as the share price 20 days before the takeover announcement minus the share price two years prior. For takeovers before the introduction of the CGT roll-over, the capital gain is calculated after indexing the assumed purchase price. For subsequent takeovers, the capital gain is multiplied by the capital gains discount of 50%. The calculated capital gain is divided by the share price two years prior to the takeover announcement. The model also includes other variables expected to be associated with the payment method choice of acquiring firms. Other variable definitions are provided in Table 1 (*t*-statistics are shown in parentheses).

Panel A: Full sample

	Cash vs Equity (1a)	*Cash vs Equity (1a)*	*Mixed vs Equity (1b)*	*Mixed vs Equity (1b)*	*Cash vs Mixed (1c)*	*Cash vs Mixed (1c)*
Intercept	0.7746 (0.21)	–0.1700 (–0.05)	–15.4660 (–2.29)**	–16.9010 (–2.51)**	10.3500 (2.36)**	10.5920 (2.44)**
CGN20	2.4991 (2.63)***	–	5.9298 (2.50)**	–	–0.8071 (–0.65)	–
*CGN20*CHANGE*	–2.0078 (–2.15)**	–	–5.0307 (–1.97)**	–	0.1593 (0.10)	–
CGNINDEX	–	0.7294 (2.19)**	–	2.1296 (2.53)**	–	0.3985 (0.62)
*CGNINDEX*CHANGE*	–	–0.1919 (–0.26)	–	–1.5077 (–1.51)	–	–0.7943 (–0.88)
CHANGE	–0.1422 (–0.24)	0.3471 (0.61)	–1.3658 (–1.09)	–0.9819 (–0.88)	1.1865 (1.51)	1.3056 (1.63)
NOL	5.7428 (1.74)*	6.4874 (1.72)*	16.3960 (1.44)	14.4540 (1.36)	19.4310 (1.90)*	20.5060 (1.97)**
TGTINST	3.5737 (1.36)	6.7614 (1.62)	7.9307 (1.56)	6.7647 (1.47)	2.5311 (0.87)	3.5045 (1.11)
*TGTINST*CHANGE*	–6.0990 (–1.66)*	–6.7614 (–1.84)*	–6.2720 (–1.12)	–5.5174 (–1.03)	–4.6593 (–1.00)	–5.7079 (–1.19)
TGTDE	0.1400 (1.28)	0.1715 (1.41)	0.1892 (0.51)	0.0790 (0.23)	–0.0626 (–0.23)	–0.0227 (–0.08)
BIDDE	0.3333 (1.39)	0.2825 (1.19)	–0.2361 (–0.51)	–0.2371 (–0.57)	–0.0764 (–0.23)	–0.0570 (–0.17)
TGTFCF	0.8024 (0.51)	1.4100 (0.89)	–5.0326 (–1.55)	–4.9363 (–1.51)	2.9429 (1.25)	2.4694 (1.08)
BIDFCF	2.1961 (2.00)**	2.0617 (1.89)*	5.9845 (1.79)*	7.2219 (1.97)**	–0.2031 (–0.11)	–0.3201 (–0.18)
BIDDIROWN	–0.8999 (–0.77)	–0.7265 (–0.63)	–0.2375 (–0.10)	–0.1126 (–0.05)	–0.0626 (–0.04)	–0.0022 (–0.01)
BIDMB	–0.1117 (–1.14)	–0.1018 (–1.03)	–0.0728 (–0.46)	–0.0574 (–0.38)	0.3173 (1.58)	0.3083 (1.51)
TGTMB	–0.1531 (–1.67)*	–0.1805 (–1.68)*	–0.5582 (–2.04)**	–0.7535 (–2.39)**	0.3230 (1.14)	0.2461 (0.76)

Table 7
Results of estimating logit regression model of the method of payment choice *(continued)*

Panel A: Full sample *(continued)*

	Cash vs Equity (1a)	*Cash vs Equity (1a)*	*Mixed vs Equity (1b)*	*Mixed vs Equity (1b)*	*Cash vs Mixed (1c)*	*Cash vs Mixed (1c)*
TGTSIZE	0.1348	0.1077	1.1622	1.1453	–0.5774	–0.5426
	(0.87)	(0.68)	(3.54)***	(3.64)***	(–3.07)***	(–2.92)***
RELSIZE	–0.3603	–0.3702	–0.8813	–0.7673	–0.8009	–0.8065
	(–1.27)	(–1.30)	(–1.11)	(–1.08)	(–1.78)*	(–1.81)*
TOEHOLD	3.0519	3.2179	6.0179	5.4593	1.4244	1.7317
	(2.17)**	(2.33)**	(2.41)**	(2.35)**	(1.03)	(1.25)
IRATE	–3.5660	–2.4765	–4.7179	–5.2280	–1.9122	–1.2617
	(–1.19)	(–0.87)	(–1.37)	(–1.05)	(–0.06)	(–0.41)
DIRREC	0.2715	0.2715	1.8946	1.9690	–0.9015	–0.9779
	(0.61)	(0.62)	(2.28)**	(2.46)**	(–1.66)*	(–1.77)*
MULTIPLE	0.7649	0.8840	0.5038	0.5576	0.0352	–0.0202
	(1.45)	(1.32)	(0.61)	(0.68)	(0.06)	(–0.03)
N	159	159	97	97	132	132
Log-likelihood ratio	52.15***	49.71***	60.05***	56.86***	33.28**	33.45**
McFadden R^2	0.2452	0.2338	0.4734	0.4482	0.2180	0.2191
% Classified correctly	77.99	76.99	88.66	87.63	80.30	81.06

*** indicates significance at the .01 level
** indicates significance at the .05 level
* indicates significance at the .10 level

Panel B: Target firms with holding periods between 0–3 years

	Cash vs Equity (1a)	*Cash vs Equity (1a)*	*Mixed vs Equity (1b)*	*Mixed vs Equity (1b)*	*Cash vs Mixed (1c)*	*Cash vs Mixed (1c)*
Intercept	–2.8950	–4.6272	–18.5910	–20.2430	8.1341	8.6020
	(–0.21)	(–0.89)	(–1.18)	(–1.34)	(1.50)	(1.55)
CGN20	2.0657	–	7.0907	–	–0.7169	–
	(2.18)**		(2.06)**		(–0.43)	
*CGN20*CHANGE*	–1.8937	–	–3.3686	–	0.2242	–
	(–1.96)**		(–2.13)**		(0.11)	
CGNINDEX	–	0.9095	–	2.2161	–	0.2836
		(2.14)**		(1.82)*		(0.32)
*CGNINDEX*CHANGE*	–	–1.4937	–	1.3476	–	–0.6778
		(–1.97)**		(0.29)		(–0.64)
CHANGE	0.6404	0.6827	4.4935	3.6351	0.4628	0.6283
	(0.92)	(0.96)	(1.00)	(0.97)	(0.46)	(0.59)
NOL	3.2030	6.3784	75.5990	56.8080	12.0510	12.4230
	(1.71)*	(1.70)*	(1.95)*	(1.69)*	(1.98)**	(1.68)*
TGTINST	5.9386	5.8576	31.2080	23.3890	5.0802	6.6833
	(1.79)*	(1.76)*	(1.54)	(1.45)	(1.00)	(1.16)
*TGTINST*CHANGE*	–7.6933	–9.0920	–16.7290	–10.6180	–7.2211	–8.8829
	(–1.69)*	(–1.86)*	(–1.00)	(–0.65)	(–1.17)	(–1.32)

Table 7
Results of estimating logit regression model of the method of payment choice *(continued)*

Panel B: Target firms with holding periods between 0–3 years *(continued)*

	Cash vs Equity (1a)	*Cash vs Equity (1a)*	*Mixed vs Equity (1b)*	*Mixed vs Equity (1b)*	*Cash vs Mixed (1c)*	*Cash vs Mixed (1c)*
TGTDE	0.0505	0.2846	1.3584	1.1728	–0.5197	–0.4830
	(0.41)	(1.65)	(1.62)	(1.57)	(–1.49)	(–1.36)
BIDDE	0.2829	0.3024	–2.6984	–2.4443	0.2393	0.2603
	(1.04)	(1.11)	(–2.28)**	(–2.06)**	(0.59)	(0.64)
TGTFCF	0.8015	0.6129	5.2195	5.2167	1.3940	1.0526
	(0.46)	(0.33)	(0.64)	(0.64)	(0.63)	(0.47)
BIDFCF	1.8816	1.7406	12.9900	14.5100	0.4275	0.3250
	(1.67)*	(1.75)*	(1.75)*	(1.68)*	(0.17)	(0.14)
BIDDIROWN	–0.6727	–1.0306	4.8136	6.0542	0.5679	0.6717
	(–0.46)	(–0.70)	(0.92)	(1.04)	(0.30)	(0.36)
BIDMB	–0.2052	–0.2876	–0.1887	–0.2102	0.2237	0.2217
	(–1.63)	(–2.30)**	(–0.83)	(–0.84)	(0.96)	(0.95)
TGTMB	–0.0696	–0.2850	–1.4150	–1.4632	0.2864	0.2840
	(–1.75)*	(–1.93)*	(–2.12)**	(–2.43)**	(1.26)	(1.05)
TGTSIZE	0.1166	0.2543	2.3292	2.3143	–0.5724	–0.5558
	(0.58)	(1.18)	(2.27)**	(2.05)**	(–2.73)***	(–2.59)**
RELSIZE	–0.2386	–0.3368	–3.4104	–3.1786	–0.7073	–0.7102
	(–0.86)	(–1.78)*	(–1.33)	(–1.22)	(–1.89)*	(–1.69)*
TOEHOLD	7.1373	7.1711	8.1370	36.0010	–2.0972	–1.9202
	(2.55)**	(2.60)***	(2.19)**	(1.98)**	(–1.04)	(–0.95)
IRATE	1.0421	–4.3759	–3.6974	–3.4115	3.1898	2.0013
	(0.03)	(–0.11)	(–1.46)	(–1.04)	(0.63)	(0.38)
DIRREC	0.4821	0.6649	4.5187	4.6254	–0.7595	–0.7400
	(0.87)	(1.15)	(2.15)**	(1.91)*	(–1.74)*	(–1.68)*
MULTIPLE	0.6222	0.6428	–1.3295	–0.5189	0.4223	0.4129
	(1.03)	(1.05)	(–0.75)	(–0.27)	(0.53)	(0.53)
N	120	120	71	71	101	101
Log-likelihood ratio	42.70***	46.22***	66.23***	56.86***	30.09*	30.19*
McFadden R^2	0.2827	0.3059	0.6295	0.5969	0.2763	0.2773
% Classified correctly	77.88	77.45	85.65	84.20	80.85	79.79

*** indicates significance at the .01 level
** indicates significance at the .05 level
* indicates significance at the .10 level

of carry forward tax losses is now positive and significant in the three variations of model (1). This finding is inconsistent with predictions. The bidding firm market-to-book ratio is negative and significant in model (1a) using the indexed capital gain. This result provides limited support that overvalued acquiring firms offer equity consideration. Higher acquiring firm leverage is found to increase significantly the probability of an equity bid relative to a mixed bid. Although this is consistent with higher levered firms avoiding debt, the insignificant finding for this variable in model (1a) suggests this result must be viewed with caution. The significant negative coefficient on the relative size of the target in model (1a) when the indexed capital gain is used provides additional support that information asymmetry leads to the use of equity payment.

4.1. Additional analysis

Target firm institutional ownership and capital gains

The results in Table 7 indicate a shift after December 1999 from cash to equity payment for takeovers with higher target institutional ownership. To determine if this change is associated with the size of target shareholder capital gains, model 1(a) is re-estimated for the two measures of capital gains after including an additional interaction variable between *TGTINST*CHANGE* and, respectively, each measure of capital gains. The coefficient on this additional variable is insignificant, whilst the conclusions drawn from the other variables remained unchanged.

Acquiring firm overvaluation

As the acquiring firms' market-to-book ratio is generally insignificant in the estimation of model (1), the findings presented provide little support that acquiring firm overvaluation results in bidding firms offering equity as payment. As an additional measure of acquiring firm overvaluation, we calculate the buy-and-hold abnormal return (BHAR) for bidding firms over the period commencing two years before the takeover announcement and ending two months prior to the takeover announcement.[11] Abnormal returns are calculated by subtracting the return on the All Ordinaries Accumulation Index from sample firm returns. Each variant of model (1) is then re-estimated with this additional variable. The coefficients on BHAR are insignificant in all the regression models.

Inside ownership

Inconsistent with expectations, we do not find any evidence that acquiring firm directors offer cash as payment to avoid diluting their stake in the acquiring firm. As Martin (1996) and Faccio and Masulis (2005) find insider ownership is only associated with payment choice at medium levels of ownership, we re-estimate model (1) after replacing *BIDDIROWN* with a spline variable. Similar to Martin (1996), low ownership is defined as a stake of less than 5%, medium ownership is a stake of 5% to 25% and high ownership is a stake of greater than 25%. The results (not tabulated) provide only limited support that insider voting rights influence the payment method choice. Acquiring firms with directors' ownership below 5% are significantly more likely (1% level) to offer equity than cash (model 1(a)) and equity than mixed payment (model 1(b)) when capital gains are defined on an unindexed basis. The coefficients on the medium and high ownership levels are insignificant indicating that the dilution of existing ownership rights is not an issue for bidding firm management with higher levels of ownership. The results on all other variables are similar to those shown in Table 7.

Method of payment and takeover outcome

Henry (2004) provides a comprehensive study of factors that influence outcome in Australian takeovers. The results of the study show no association between payment method and the successful completion of a takeover offer. For the takeovers included in the method of payment choice tests, we prepare a contingency table as a simple test of the association between the payment method and the takeover outcome. Similar to Henry (2004), we cannot reject the null hypothesis of no association between the takeover outcome and the payment form ($\chi^2_{2df} = 1.12$).

5. Conclusions and future research

It has been commonly hypothesised that shareholder-level taxation is an important determinant of the form of consideration offered in corporate acquisitions. Prior studies in both Europe and the US, however, have been unable to document an association between the size of target shareholder capital gains and payment method. Taking advantage of a change to the CGT arrangements in Australia, this study provides a direct test of the influence of shareholder level taxation on the method of payment choice in takeovers.

Confirming the importance of shareholder level taxation in the structure of corporate acquisitions, we find a significant association between estimates of target shareholder capital gains and the payment form offered after the removal of the immediate taxation of scrip-for-scrip exchanges in December 1999. The results are, however, sensitive to the proxy used to estimate capital gains. Our results using an unindexed measure of capital gain show a shift in acquisition structure for both the full set of observations and those target firms

[11] Abnormal returns are measured only until two months before the takeover announcement to ensure that any information leakage surrounding the takeover is excluded.

that have an average holding period of less than three years. When we estimate capital gains using an indexed measure, we only document a shift from cash to equity payment for target firms that have an average holding period of three years or less. This study also documents that higher institutional ownership in a target firm leads to a reduction in cash takeovers in favour of equity payment subsequent to the regulatory change. This is consistent with acquiring firms offering a payment form that allows institutional owners to defer CGT.

Future research investigating the influence of target shareholder capital gains on acquisition structure may consider using a survey of acquiring firms or takeover advisers to obtain greater appreciation of the importance of target shareholder taxation in choosing a payment form. For example, such a survey can establish the importance and ranking of target shareholder capital gains as a factor that bidding firms consider when choosing a payment method. Additionally, the method employed by acquiring firms to calculate target shareholder capital gains and the assumed holding period of target shareholders can be more specifically determined.

In addition to investigating the influence of target shareholder taxation on payment method, this study adds to prior research in Europe and the US on factors that influence the method of payment choice. The study shows that target firms with a higher market-to-book ratio are more likely to be offered equity. This finding is consistent with these target firms having a higher degree of information asymmetry and more uncertainty as to potential synergies. Furthermore, we document that acquiring firms with greater free cash flow and a higher toehold stake are less likely to offer equity consideration. Finally, a mixed payment type is more frequently offered when the target firm is larger and the takeover is friendly. This result is consistent with these target firms having greater negotiating power in relation to the bidding firm, thereby allowing them to negotiate a mixed payment type for their shareholders.

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The role of change agents and imitation in the diffusion of an idea: charge and discharge accounting

Michael John Jones*

Abstract—Medieval charge and discharge accounting was the most prevalent accounting system of its time. The first medieval charge and discharge system can be identified in the English Exchequer about 1110. This paper argues that the ideas behind the Exchequer were gradually diffused both internationally and nationally. This paper charts the export of charge and discharge systems to other European Exchequers, to monasteries and bishoprics, to lay estates, to manorial accounting, to guilds, boroughs, universities and parishes. From a single high status source at the start of the 12th century, charge and discharge accounting came to be imitated through mimetic and normative institutional isomorphism by a wide range of lower status medieval institutions by the late 15th century. In the first phase of diffusion, certain key individuals of wealth and power are identified as change agents. In the second phase, individuals, and accounting and estate management texts played an important role in the diffusion. The role of geographical proximity and accidents of history is also explored.

Keywords: change agents; charge and discharge accounting; diffusion; Exchequer accounting; imitation

1. Introduction

Understanding how accounting has changed over time is an important motivation which has underpinned much historical research (Napier, 2006). The diffusion of accounting ideas and practices has been the focus of several historical studies (e.g. Johnson and Caygill, 1971; R.H. Parker, 1979, 1989; Boyns and Edwards, 1996; Camfferman, 1997; Burns, 1999). From these studies we have gained some understanding of the mechanisms by which accounting practice is disseminated over time. In particular, the role of change agents (such as accountants, accounting texts and legislation) has been highlighted. In addition, there has been support for the idea that accounting practices originate in high status organisations and are then copied by lower status organisations. However, despite this work as Burns (1999: 568) points out:

> 'minimal attention has been devoted specifically to understanding and explaining why and how accounting evolves in the manner it does, through time, and within specific organisational settings.'

This particular paper builds on the prior research by providing an insight into the diffusion of change in medieval England. This paper contributes to our knowledge of historical development by analysing, for the first time, to the author's knowledge, the spread of a significant accounting innovation, charge and discharge accounting, throughout the early Middle Ages, from the 12th to the 15th centuries. It demonstrates how starting at the English Exchequer, the most important financial institution in England and arguably the most advanced in Europe, charge and discharge accounting spread to other European Exchequers.[1] After this first phase of expansion, the adoption of charge and discharge accounting is charted in other lower status medieval institutions such as monasteries and bishoprics, manors, guilds, boroughs, universities and parishes. Although charge and discharge accounting's use has been studied in these contexts before, there has been little attempt to show its spread over time. This is particularly surprising given the widespread attention to the diffusion of double-entry bookkeeping (e.g. Chatfield, 1973; Yamey, 1975, 1980; L.M. Parker, 1989; Scorgie, 1994).

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[1] Potentially, given the almost universality of usage of charge and discharge in medieval Europe's financial institutions the scope of this paper is potentially limitless. To make this study manageable, the author seeks to establish the main lines of development rather than all possible lines. The author takes the view that the basic principles of accountability enshrined in Exchequer accounting formed the basis for charge and discharge accounting. Thus, charge and discharge is a simplified form of Exchequer accounting.

This paper also makes three important contributions to accounting theory. First, drawing upon change agent theory it highlights the significant role played by individuals and books in the transmission of accounting knowledge. Accounting's development cannot be understood without reference to key individuals (Carnegie and Napier, 1996). This paper thus answers the call for a greater exploration of the role of key personalities in accounting history (e.g. Yamey, 1981; Boyns and Edwards, 1996). For example, it highlights how Peter des Roches and Archbishop Pecham played a key role in the diffusion of exchequers to the Church. Second, it shows how innovations diffuse from socially high status organisations to lower status organisations. From the Royal Exchequer, the practices gradually spread to the monasteries and bishoprics, to lay estates and then down to the manors. This contributes to the earlier historical work, which illustrated the role of imitation in accounting (e.g. Johnson and Caygill, 1971; Camfferman, 1997). It also complements a broader historical research which highlights the diffusion of documentary practices throughout medieval England (Clanchy, 1998). Third, it highlights the role of other factors in the diffusion of accounting knowledge such as geographical proximity and accidents of history. In particular, it shows how Exchequer accounting spread from Winchester to other parts of England.

Charge and discharge accounting, the most prevalent accounting system in medieval Europe, was well-suited to the social, economic and political conditions of the time. It was essential to the efficient functioning of the newly centralised English state (Hollister, 2001). In particular, Bryer (1994) argues it was well adapted to the social relationships of feudalism. Before the adoption of double-entry bookkeeping which accompanied European industrialisation, charge and discharge accounting was in widespread use by governments (Lyon and Verhulst, 1967), religious institutions (Smith, 1941), landlords (Booth, 1981), boroughs (Jones, 1985) and universities (Jones, 1991; Jones, 1992).

Both primary and secondary sources are used. The primary sources include fitz Nigel (1179) on the early Exchequer; early ecclesiastical accounts (Smith, 1941); accounts of St Swithun's Priory Winchester (i.e. Winchester Cathedral Priory) (Kitchin, 1892) and the bishopric of Winchester (Holt, 1964); early lay estates (Patterson, 1973); early borough accounts of Shrewsbury (Historical MSS Comm., 1899) and Leicester (Bateson, 1899); early guild accounts (Gross, 1890) and early Oxford University accounts especially Merton (Highfield, 1964).

The remainder of this paper is structured in four sections, followed by a conclusion. In Section 2 the role of change agents and imitation in the dissemination of accounting ideas and practices are explored. In Section 3, the essential nature of charge and discharge accounting is outlined with particular reference to Henry I's Exchequer. After this, in Section 4, the diffusion of charge and discharge accounting to other medieval institutions is charted. In Section 5, the role of change agents and imitation in the diffusion process is discussed.

2. Change agents and imitation

An important strand of historical research is the development of theories to explain the nature of accounting change (Jones and Oldroyd, 2008). A particularly important contribution by Parker (1979) is the notion of change agents who play a key role in the transference of accounting thought and practice. This theory helps to bridge the gap between accounting theory and practice as identified by Yamey (1981); Boyns and Edwards (1996). Change agents are active innovators (Niehoff, 1966) who play a key role in diffusion theory (i.e. the way ideas and practices are disseminated over time). Although there have been a number of diffusion studies in management accounting (Bjørnenak, 1997; Ax and Bjørnenak, 2005) and the public sector (Jackson and Lapsley, 2003; Perera, McKinnon and Harrison, 2003; Lapsley and Wright, 2004) almost none focus on the role of change agents or imitation. Parker (1979) identified several possible change agents: individual accountants, international organisations, governmental agencies, multinational companies, teachers and textbooks. Parker (1979: 129) argues that accountants, as individuals not as professional bodies, 'appear to have acted as change agents' in the development of consolidation accounting.

More recently, R.H. Parker (1989) finds evidence that British merchants imported double entry bookkeeping through two main change agents either reading a book or manuscript or learning from an individual such as a teacher or merchant. L.M. Parker (1989) suggests Jewish agents, in the Middle Ages, acted as international change agents in the diffusion of double-entry accounting. In a more contemporary setting, Ax and Bjørnenak (2005) point to the importance of books and articles in the diffusion of the balanced scorecard in Sweden from 1990–2004. Boyns and Edwards (1996) explore the role of change agents in disseminating accounting technology in Welsh industry from about 1750 to 1870. They conclude:

> 'The most likely change agents therefore were proprietors and their agents, and the movements of such individuals, both within and between industries, aided the process of dissemination of accounting techniques' (1996: 27).

Burns (1999) studied accounting change in a

small chemicals manufacturer showing the importance of one key individual, the managing director, in instilling a new corporate philosophy and new forms of accounting. Finally, Perera et al. (2003) in a study of diffusion in a government trading enterprise from 1991–2000 show the important role played by the CEO and senior accountants.

In the dissemination of charge and discharge accounting, the main change agents are individuals and didactic books. Where the evidence permits, specific individuals are identified; if not, the type of individual (such as magnate or administrator) is specified. In the medieval period, change agents such as international organisations, government agencies, and multinational companies are notable by their absence.

Medieval England was a hierarchical society where power flowed downwards from the King and the Pope. It was a pyramidal structure dominated by the King, bishops and earls with a limited number of men of power and influence. In the main, these were lay magnates (e.g. Robert Earl of Gloucester or Robert Count of Meulan), or bishops (e.g. Roger Bishop of Salisbury or Walter of Merton, Bishop of Rochester). Many of the magnates had inherited wealth, leading an itinerant lifestyle with lands in Normandy, France and England. The bishops were appointed by the Pope or, more commonly, by the King, as a reward for loyal service. Generally, it is these men who can be identified as agents of change responsible for diffusing Exchequer accounting to the Church and the lay estates.[2]

This paper also throws light on how lower status organisations borrow from higher status organisations. The tendency to innovate is highly related to higher socioeconomic status (Rogers, 1995: 347) as demonstrated in a variety of settings such as cultural innovation (Borsay, 1994) or scientific management (Taksa, 1995). In accounting, Johnson and Caygill (1971) showed how highly esteemed British accountancy bodies influenced the spread of professional accountancy bodies through the Commonwealth. Meanwhile, Camfferman (1997) showed that high profile, high status Dutch companies were always in the vanguard in the spread of voluntary financial reporting in the Netherlands from 1945–1970.

This adoption by organisations of new accounting practices has been termed isomorphism and is a key element of institutional theory (Rodrigues and Craig, 2007: 742). Institutional isomorphism has three types: mimetic, coercive and normative (Tuttle and Dillard, 2007: 391). Mimetic isomorphism is where '[O]rganizations tend to model themselves after similar organizations in their field that they perceive to be more legitimate or successful' (Dimaggio and Powell, 1983: 152). Coercive isomorphism relates to dependence on other entities, whereas normative isomorphism results from professionalisation and structuralisation. In accounting, Carpenter and Feroz (2001) see early GAAP adoption as coercive isomorphism, while Rodrigues and Craig (2007) see IFRS adoption as normative isomorphism.

3. The first medieval charge and discharge systems: the English Exchequer

Essentially, the Exchequer was an auditing body set up to check that the King's revenue was properly accounted for and paid into the government's treasury (Jones, 2008a). The origins of medieval charge and discharge accounting can be traced to Anglo-Saxon England and to the post-1066 Anglo-Norman state (Jones, forthcoming). The Exchequer system itself, first mentioned in 1110, appears to have been devised in Henry I's reign (1100–1135) by Roger of Salisbury, the King's Justiciar.[3] Roger of Salisbury can be seen as the first of a long line of change agents that first created and then disseminated Exchequer accounting. There was an upper Exchequer (an auditing chamber), the main institutional innovation (Lyon and Verhulst, 1967), which met formally twice a year and a lower Exchequer (the treasury). Seventeen royal officials sat round the Exchequer table (a table covered with a striped cloth: called *scaccarium*) and watched the treasurer interview the sheriff, the King's official from England's county shires (Jones, 2008b), formally render an account (*redditus compotus*). The revenues accounted for were principally the farm (annual fixed payment from the sheriffs to the King from the royal manors of the shire), taxes such as Danegeld, royal profits from justice, and payments from any boroughs and towns within the shire. The sheriffs would have spread knowledge of the workings of the Exchequer to the shires and towns for whose revenue they accounted. The basic principle underpinning the Exchequer system was 'charging' the sheriff with the King's revenue and 'discharging' the sheriff when he had successfully rendered his account (Baxter, 1980; Edwards, 1989).

The English Exchequer was a unique financial institution. Although many of its individual elements can be traced to earlier times, the whole structure itself was an important innovation in the history of financial administration (Lyon and Verhulst, 1967; Hollister, 2001). The whole was in

[2] Below these leading lay and ecclesiastical magnates was the mass of the population. Of most of these, peasants and monks, there is little historical record. However, Crouch (2004a) suggests that Royal clerks were often quite mobile – moving from office to office and place to place.

[3] Our knowledge of the Exchequer is principally gleaned from Richard fitz Nigel's book *Dialogus de Scaccario* written about 1179. Jones (2008b) evaluates this important historical document.

many ways, greater than the sum of its parts. However, it is perhaps possible to distil some of its key features below:

- A biannual rendering of an account at Easter (view of the account) and, particularly, a final audit at Michaelmas (September).
- Personal accountability on oath from the sheriff to the King formally represented by Royal officials.
- A detailed examination (audit) of the rendered account.
- The formal charge and then discharge of the officials, using a set terminology.
- A defined protocol understood by all parties, which might involve an Exchequer table (Baxter, 1989; Hoskin and Macve, 1986) based on an abacus (Haskins, 1912; Evans 1979).
- The maintenance of permanent records on pipe rolls and tallies in Latin using roman numbers.[4]

A system with all the above elements is definitely a charge and discharge accounting system. However, a system can generally be classified as a charge and discharge system if most of these elements are present.

4. Diffusion of charge and discharge accounting

4.1. To other European states

Western Christendom in the early Middle Ages shared much in common. England, Flanders, France (the Capetian state) and Normandy were affected by an 11th-century economic revival. There was a pressing need to develop a centralised, well-organised financial system for collecting and disbursing revenue. Any state, without such a system, would be seriously disadvantaged vis-à-vis its neighbours, particularly when at war.

Just because the basic social and economic conditions of the different states are very similar does not necessarily mean that their solutions to the problem of collecting the finances will be the same. However, the systems adopted seem so similar that it is improbable that they developed internally without external borrowing. The evidence is persuasive, but not necessarily conclusive, that the Exchequer accounting system can be traced from England then to Normandy, Scotland, Flanders and France (Jones, forthcoming, provides further details on this). This likelihood is heightened as administratively the English government was the most advanced in Europe and was an obvious place for other less-advanced states to look to when implementing new administrative systems. The mobility of individuals around Europe make them obvious potential change agents. The different national Exchequer systems are discussed below in the most probable order in which they developed (Figure 1 shows both the international and national pattern of diffusion).

Normandy

It is no surprise that Normandy and England essentially shared the same system of financial administration by the end of the 12th century. They were, after all, ruled by the same Kings after the Norman Conquest (1066) until 1204. The English and Norman Exchequers had the same basic features and the same type of record (Lyon and Verhulst, 1967: 88). There was a *scaccarium* (Exchequer), part of the royal household, staffed by the Anglo-Norman barons of the Exchequer and a Treasury. The accounts were enrolled as in England on pipe rolls, on the *Magnus Rotulus Scaccarii Normanniae* (Great Roll of the Norman Exchequer). The Norman Exchequer like its English counterpart met twice a year at Easter and Michaelmas and used an abacus. The evidence such as it is (i.e. earlier surviving English documentation, more advanced economic development and stability of the English realm), taken cumulatively, appears to indicate that the English Exchequer developed a few years before the Norman (Lyon and Verhulst, 1967: 88).

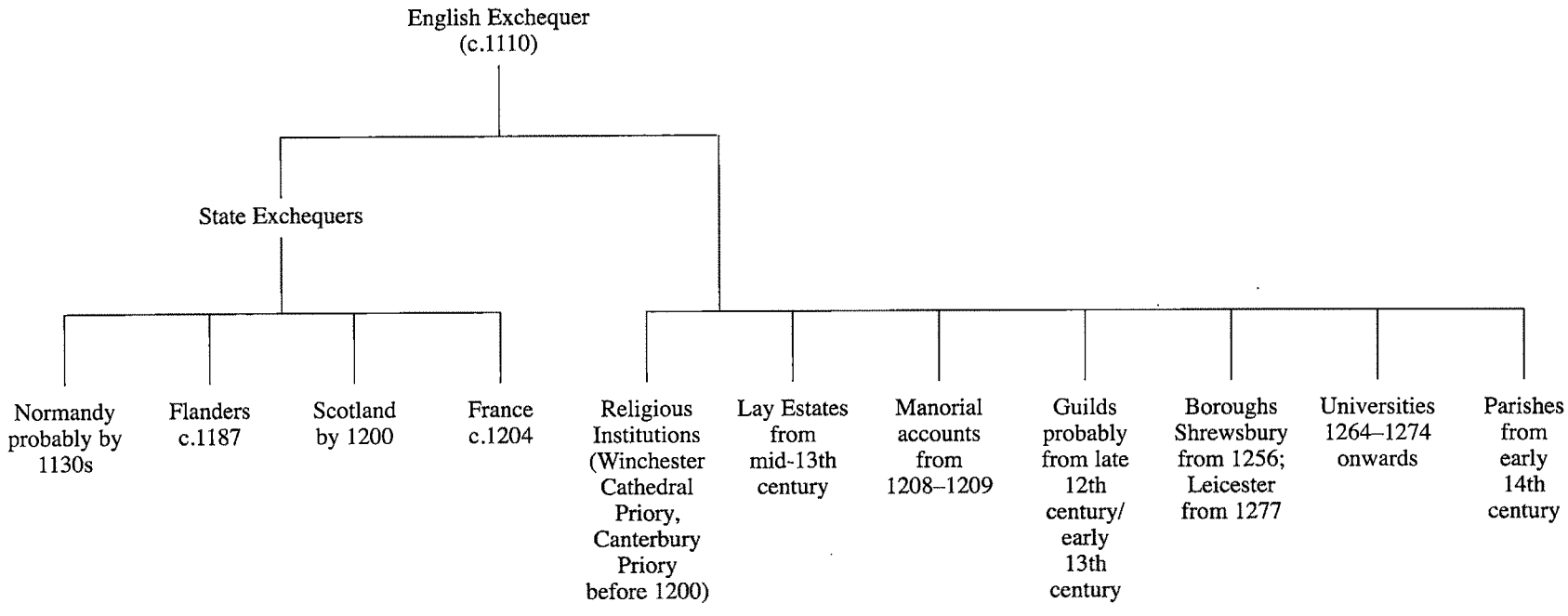
Many of the wealthiest landowners were common to Normandy and England such as Henry I's intimate counsellors, Robert Count of Meulan and Robert Earl of Gloucester (Hollister, 2001: 366). These magnates familiar with the English Exchequer system are likely to have played a key part in the development of a Norman system modelled on the English system. A tantalising glimpse of individual influence is provided by the visit of Richard fitz Nigel, King Henry II's treasurer, to Normandy. Hudson (2004: 1) suggests: 'It is conceivable, although unprovable, that Richard's trip was connected to the financial reorganisation in Normandy during 1176'.

Scotland

Twelfth-century Scotland's economic retardation delayed the necessity for a Scottish Exchequer. However, by the end of the 12th century one was in existence (Brown, 1905; Britnell, 2001). The Scottish sheriffs rendered their accounts from the royal burghs (boroughs) at the Scottish Exchequer in front of the King's auditors. Generally, the accounts follow the English model. The sheriffs accounted for farm rents, were audited on chequered cloth and the records engrossed on parchment rolls. Given the similarity of the two systems and the extensive contact between England and Scotland then individuals are likely to have trans-

[4] Accounting records were written on pipe rolls (made out of calf's skin) which were rolled up for storage (as they looked like pipes, they were termed pipe rolls).

Figure 1
Diffusion of charge/discharge accounting



ferred knowledge of the English system to Scotland. However, it is not possible to identify any particular individual as a change agent. The Scottish Exchequers were probably modelled on the English Exchequer because of its perceived success.[5]

Flanders

Although 12th-century Flanders was very advanced economically, it was relatively slow to monetarise. However, as in England 'expanding government, centralisation and economic growth forced greater efficiency in financial institutions' (Lyon and Verhulst, 1967: 85). Reform in 1089 led to a primitive decentralised accounting system. Only in the last half of the 12th century (certainly by 1187) was a centralised auditing meeting of the *ratiocinatores supremi*, analogous to the English Exchequer, established. The English system was the most likely model. Lyon and Verhulst (1967: 80–81) comment:

> 'In almost every respect the English Exchequer of the twelfth century was more advanced ... The annual auditing sessions were better organised, the accountable officers more strictly supervised, the Pipe Rolls more detailed and accurate ..., the system of reckoning accounts more sophisticated, and the conversions of incomes in kind to money more rapid.'

Unknown individuals are likely to have acted as change agents. The success of the English system and its reputation for efficient administration would have encouraged imitation. Certainly, the actual mechanics of these *redeninge* (for example, abacus, Exchequer table and tallies) were borrowed from England. The English term for Exchequer, *Scaccarium*, was used to describe the new Flemish system.

France

Politically France, under its Capetian rulers, lacked strong rule, was unstable and economically underdeveloped. Only with Philip Augustus's conquest of Normandy in 1204 did the French administrative system develop. The French imitated the well-organised Norman financial administrative model (Lyon and Verhulst, 1967). The superiority of the English Exchequer, already exported to Normandy, thus encouraged France to imitate a similar system. In this case, Phillip Augustus or his advisers were the most likely change agents.

4.2. To monasteries and bishoprics

Church and state represented the two intermingled pillars of medieval English society. The Church played a significant role in economic, social and political life. Nominally, the Church was controlled by the Pope, but in practice ecclesiastical preferment was a common source of Royal patronage. Many of Henry I's advisers, such as his Justiciar, Roger of Salisbury, became bishops. Taking the English treasurers, Richard fitz Nigel (1158–1196) was Dean of Lincoln, while his successor, William of Ely, was Archdeacon of Ely and Canon of St Pauls. Given their presence at the heart of English government, their consequent knowledge of the Exchequer and their leadership of monasteries and bishoprics, these men constituted obvious potential agents of change. Archbishop Baldwin of Canterbury and the Bishop of Winchester, Richard of Ilchester (1174–1188), for example, are known to have attended the Exchequer. It is thus logical that Canterbury and Winchester are the earliest known monastic adopters of an Exchequer-based accounting system.

At a lower level many individual clerics actually reported to the Exchequer.

> 'Episcopal estates had a special reason to develop efficient management and accounting, since the estates reverted periodically to the king. It was essential for them to develop a permanent staff and a continuous accounting system which functioned with equal precision under bishop and king' (Oschinksy, 1971: 224).

When the Abbey of St Edmund was vacant in 1180–1182, Wimer, sheriff of Norfolk and Suffolk, rendered the accounts of the wardens of the Abbey to King Henry II's Exchequer in charge and discharge form (Rokewode, 1840: 109–113). There was, thus, familiarity in ecclesiastical circles with both the centralised Exchequer audit and with the specific form of charge and discharge accounting.

Developments in the financial administration of the monasteries and bishoprics in the 12th and 13th centuries appear to draw upon Exchequer practice in two main respects: centralised exchequers (discussed below) and local manorial accounts based on charge and discharge principles (see next section). The need for central control of English monasteries arose from the problems created by the obedientiary system[6] whereby a large part of the ecclesiastical revenues was allocated to different individuals with no centralised control (Snape, 1926: 29).

One method of controlling the obedientiaries was the centralised audit, first established in high profile monasteries in the South of England, in particular, Winchester and Canterbury. Centralised audits often dealt with the accounts of both the monasteries themselves and their estates, the latter being, in effect, manorial accounts. Winchester is

[5] Britnell (2001) maintains that by 1200 an Irish Exchequer and Gwynedd (a Welsh region) had formally audited written accounts, but no permanent exchequer.

[6] Obedientiaries owed a special obligation of obedience to the prior or abbot (Kitchin, 1892: 31).

particularly striking given its geographical connection to the Royal Exchequer, often based in Winchester.

> 'The first regular system of centralised audit to be established in an English monastery was probably that which Henry of Blois instituted at Winchester Cathedral Priory sometime between 1153 and 1171' (Smith, 1941: 74).

Henry of Blois may also have introduced a similar system at Glastonbury (see Douie, 1952). Henry of Blois, Bishop of Winchester, the agent of change, was an influential member of Henry II's inner circle and without doubt knowledgeable of Exchequer accounting practice. He established a committee of 12 senior monks to examine the accounts of all the obedientiaries annually. This system persisted and resembled that of the Exchequer system. The obedientiaries presented their accounts at the Michaelmas audit while the serjeants and reeves' individual manorial accounts were summarised onto a Pipe Roll, *Pipa Prioratus Wyntanie* (extant from 1248–1326). The compotus rolls, summarised by Kitchin (1892), are presented in typical charge and discharge format. For example, a certain Walterus Godefrey, bailiff, renders account at Michaelmas 1345. His income and expenses are presented and then he is discharged (*Sic quietus est*) (Kitchin, 1892: 145–150). Indeed, the monks probably used an exchequer board (or *scaccarium*) as one is illustrated on one of the pillars of the North transept of Winchester Cathedral (Kitchin, 1892: 507).

The Exchequer system at Christ Church, Canterbury, also predates 1200. Canterbury was the most important diocese in the country. 'The Archbishop's household was probably the most literate and highly cultivated in the country' (Cheney and Jones, 1986: xlii). The apparent agent of change here is Archbishop Baldwin who wished to regain control of some property and revenues which his predecessor had let slip into the hands of the monks (Holdsworth, 2004). From 1186, after a struggle between Baldwin, Archbishop of Canterbury (1185–1190) and the monks, a central receiving office was in place.

The system itself had 'much in common with that of the Royal Exchequer' (Smith, 1941: 85). The Christ Church centralised annual audit took place at Michaelmas and a general account, the *assisa scaccarii*, was drawn up. The audit was performed by eight senior monks, called *barones* (analogous to the Barons of the Exchequer), who seem to have used a chequered table as in the Royal Exchequer (the 1313 *Assisa Scaccarii* is headed by a chessboard: Smith, 1941: 86). The accounts were enrolled in charge and discharge format.

A third religious central auditing committee set up before 1200 was at Waltham, when Henry II refounded the monastery in 1177. In this case, the probable change agents were the King or Royal administrators as it would have been logical to institute a system modelled on the English Exchequer. By 1191, a common control of revenue was in place.

The next major step in the creation of centralised exchequers in England was undertaken by Archbishop Pecham, an important change agent. Smith (1941: 78) comments:

> 'Pecham may, indeed, be fairly called the creator of monastic exchequer organisation in this country and it can hardly be a coincidence that the word scaccarium comes into general use in English monastic records at this period.'

As Archbishop of Canterbury (1279–1292), Pecham would have been familiar with the system at Christ Church, Canterbury.

The Christ Church model, which itself had emanated from the Royal Exchequer, now 'deeply influenced Archbishop Pecham and helped to mould his reforming programme' (Smith, 1941: 78). Between 13 September 1281 and 22 September 1284, Pecham instituted central treasuries and auditing committees in at least 13 religious houses.[7] Although the centralised exchequer did not fully function everywhere, Pecham's model was widely adopted in many monasteries such as Ely, Glastonbury and Reading. These were not uniform systems; but all appear broadly to have resembled the Royal Exchequer. Pecham himself used the term *scaccarium* which suggests he believed he was introducing an Exchequer type system. These systems persisted until the 15th century when monastic exchequer organisation greatly declined.

The earliest episcopal accounting records are manorial accounts dating from the early 13th century. A centralised audit existed on the Bishopric of Winchester for 37 manors from at least 1208–1209. The Winchester estate was one of the half-dozen greatest landed estates in the realm (Campbell, 2003). The Bishop of Winchester was the wealthiest churchman (Campbell and Bartley, 2006).

The Winchester audit appears to be based on, and was very similar to, Exchequer practice.

> 'It seems likely that the establishment of a centralized audit was the result of the conscious imitation by the bishops of Winchester of the model provided by the Royal exchequer, with which they were so familiar' (Holt, 1964: xix–xx).

[7] Bardney, Eynsham, Lesnes, Mottisfont, Rochester, St Martin's, Dover, Southwark, Llanthony and other South Wales monasteries, Ely, Reading, Glastonbury and Rochester (Douie, 1952: 172–174).

This imitation is unsurprising given the geographical proximity of the Royal treasury at Winchester, the intimate knowledge that Bishops of Winchester had of the Royal Exchequer and of the Winchester Cathedral priory (Hall, 1903: x).[8] Indeed, the methods used were almost identical to those already instituted at Winchester.

The principal agent of change appears to have been Peter des Roches who for 'more than thirty years ... exercised an influence over the Plantagenet Court second only to that of the King' (Vincent, 2004c: 4). Peter des Roches (Bishop of Winchester 1205–1238) was the 'King's Justiciar and Henry III's financial expert' (Clanchy, 1998: 74). A contemporary satirist described him as 'The warrior of Winchester, up at the Exchequer, keen on finance, slack at the scriptures' (Wright, 1839 as cited in Vincent 2004b: 1). According to Vincent (2004c: 4):

> 'It was during his years as bishop that a new form of written record, the Winchester pipe rolls, was introduced to accounting procedure on the Episcopal estates.'

The financial reforms at Winchester were introduced soon after des Roches' election as bishop and the surviving rolls clearly demonstrate his personal oversight. He drew on his intimate experience of the Exchequer gained as the King's Justiciar (1213–1214), as a Royal sheriff and as a Baron of the Exchequer from 1208. His key role at the Exchequer is shown by his involvement in establishing a series of castle treasuries at Corfe, Bristol and elsewhere (Vincent, 2004c: 58).

At Winchester Cathedral Priory, evidence also exists of another influential individual change agent. In 1253, Aymer Lusignan, Bishop elect of Winchester insisted that 'the monastic obedientiaries render accounts for their offices before the Episcopal Exchequer at Wolvesey Palace [the Bishop of Winchester's household]' (Vincent, 2004a: 4). Lusignan undoubtedly had a good knowledge of Royal administration given that he was the half brother of Henry III and his mother, Isabella of Angoulême, was King John's widow. His election as bishop was commanded by Henry III.

4.3. To lay estates

The lay earls, barons and knights were generally slower to imitate Royal methods than the bishops and abbots. This applied to both documentation, in general, and exchequer practice, in particular. Their comparative slowness to adopt centralised auditing methods may have been due to the more centralised and compact nature of the larger religious estates (Denholm-Young, 1937: 1). Nonetheless, two important early exceptions demonstrate the importance of individuals as change agents and their desire to imitate the Royal Exchequer. First, Robert de Beaumont, Count of Meulan, a leading landowner and member of Henry I's inner circle created his own baronial Exchequer at Leicester a few years after the establishment of a Royal Exchequer (some time before Robert's death in 1118). This was continued by his son Robert II, Earl of Leicester, also a Baron of the Exchequer who presided over the Exchequer from 1155–1168 as Royal Justiciar (Crouch, 1986: 91). The Leicester Exchequer met at least once a year at a fixed date and location and continued into the 13th century. Local officials, as at the Royal Exchequer, paid their farms. Second, Robert of Gloucester, a leading magnate, developed administrative machinery based on the Royal model (Hollister, 2001: 367; Patterson, 1973: 30). Robert, Henry I's illegitimate son, was entrusted with the task of overhauling the treasury in 1128–1129 (Crouch, 2004b). Intriguingly, as well as directly imitating the Royal Exchequer, some evidence suggests the Leicester Exchequer may have influenced the Gloucester Exchequer. A Leicester clerk, Adam of Ely, moved to Gloucester where he became a leading figure before 1165 (Crouch, 1986: 166). Denholm-Young (1937) cites other early lay Exchequers from the mid-13th century.[9]

We have substantial details of one local Exchequer, that of Edward III's son, Edward, the Black Prince who seems an important change agent. There was certainly an independent Exchequer in Chester in the mid-14th century and probably Exchequers in his lordships in Cornwall, Wales and Aquitane. From 1343–1344, Edward also set up an Exchequer at Westminster, close to the Royal Exchequer (Barber, 2004). Many of the prince's financial officers had often been King's clerks and vice versa. In the 1340s, the Chester Exchequer was dominated by Royal officials such as Bishop Edington of Winchester, treasurer of England and Robert Sadington, a Baron of the Exchequer. Indeed, at a lower level as with Adam of Ely, the exchange of personnel between both lay and ecclesiastic institutions would have facilitated the transference of accounting practices.

The Palatinate of Chester's accounts (*Magnus rotulus scaccarij*: Booth, 1981: 48; Denholm-Young, 1937: 146) were modelled on the Royal Exchequer. Extant evidence suggests 'a system of squared cloth and counters, the production of bags full of earlier accounts, innumerable writs, vouch-

[8] Henry of Blois (Bishop of Winchester 1126–1171) was the brother of King Stephen (Dobie, 2005). Richard of Ilchester (Bishop of Winchester 1174–1238) was Henry II's watchdog. Godfrey de Lucy (Bishop of Winchester 1189–1204) was a Royal justice, son of a Justiciar and 'a favoured member of the Royal household' (Venables, 2004: 1).

[9] Lord Edward at Bordeaux, Bristol, Chester and Dublin circa 1254; Isabella de Fortibus at Carisbrooke circa 1260; Edward of Cornwall at Eye; Earl of Gloucester in the reign of Henry IV at Bristol and the magnates of the Welsh marches.

ers and tallies' (Denholm-Young, 1937: 147), charge and discharge like records, pipe rolls, biannual audits, an accounting year running to Michaelmas, oathtaking by officials and the use of an Abacus table (Booth, 1981).

At a lower level of society the evidence suggests that, sheriffs who were not normally large landowners, imitated the Royal Exchequer of which they had intimate knowledge. By the 13th century, there were shrieval Exchequers at both York and Exeter (Denholm-Young, 1937).

4.4. To manorial estates

The ecclesiastical and lay exchequers provided the centralised control for the medieval financial administration. However, exchequer audits were based on individual, ecclesiastical and lay manorial accounts. A manor consisted generally of a single administrative unit of landed estate, comprising a whole village or small farm (Harvey, 1972).

About 1220, Harvey (1984: 5–7) demonstrates a shift from leasing to demesne farming (farming directly by the Lord with a bailiff). Harvey sees this move to demesne farming as a decisive stimulus for the production of English manorial records as the lord of the manor needed some form of account-keeping to check on the bailiff.[10] Landowners, lower down the social order, thus adopted the practices of their social superiors.

By the 13th century, a hierarchical management system of estate management existed. At the top was the lord of the manor, supported by a team of auditors who biannually (the 'view' and final audit) checked the accounts. This took place either in a fixed Exchequer (e.g. Wolvesey Castle for the bishop of Winchester or Carisbrooke for Isabella de Fortibus) resembling the Royal Exchequer or alternatively, in itinerant audits, where the auditors visited individual manors. These itinerant audits might supplement or supplant the Exchequer system.

The first account records from individual manors date from the early 13th century.

> 'It is likely that estate administrators, following the lead of the Royal Scaccarium, realised the advantages of written accounts both as a source of data for forward planning and more importantly as an aid to control' (Noke, 1981: 138).

The actual account was drawn up, if not by the reeve, by a trained scribe or by a cleric, such as a parish priest.[11] The accounts were standardised and audited. Specimen accounts were available. The basic organisation followed the charge and discharge format that was well-established at the Exchequer. For example, in the Winchester Pipe Roll 1210–1211, individual bailiffs render account using the same terminology as the sheriffs of the Exchequer. Thus, in the manor of S(tan)ham: John of the farm of Stanham renders account for 30s. (*Johannes firmarius de Stanham reddit compotum de 30s*). The bailiff then either owes (*et debet*), has paid (*solvit*) or is quit (*et quietus est*). In addition, much of the technology underpinning manorial accounts resembled that used in the Exchequer. There was, for example, extensive use of tallies, an Abacus (Oschinsky, 1947), and accounting rolls drawn up to Michaelmas.

Overall, the evidence is fairly conclusive that manorial accounts were simpler, less complex versions of earlier, more established exchequer practices with the same basic idea of making individual officials accountable to a centralised authority. Individuals were charged with arrears and receipts and then discharged through authorised expenditures.

Manorial accounting methods gradually spread. Undoubtedly, unknown individuals such as lawyers, estate stewards and accountants would have played a key role. They were aided by 'didactic works both on estate management in general and on accounting in particular' (Oschinsky, 1947: 5). These acted as change agents for manorial accounting. Oschinsky (1947) identifies 20 treatises on accounting based either on a single estate or containing specimens of several accounts.[12]

Undoubtedly, specimen accounts from as early as 1225 helped the uninitiated to acquire accounting expertise and standardise presentation. Estate management theses, such as Walter of Henley and The Rules of Robert Grosseteste, also contributed to the dissemination of accounting practices (see Oschinsky, 1971). In addition, it is possible that the *Dialogus de Scaccario* (c.1179) itself was used as a model of Exchequer accounting. The ready need for such didactic instruction is evidenced by the regular teaching of manorial accounting at Oxford by the end of the 13th century (Richardson, 1939). The role of Robert Grosseteste in the diffusion of accounting practice is particularly interesting. Well-educated and well-networked Robert Grosseteste was an important and influential cleric. His adoption and proliferation of the notion of an annual audit in the 1260s is likely to have been particularly significant.[13]

[10] Oschinsky (1971) attributes the success of English demesne farming to the well-developed Royal accounting system which private estate owners adapted.

[11] Much published material exists on the general arrangement of these accounts. Interested readers are referred, in particular, to Bennett (1937: 188); Hall (1903); Holt (1964).

[12] The earliest by William Hasely, circa 1225, exemplifies a manorial reeve and household account.

[13] Thompson (2004) suggests Grosseteste may have lectured Pecham. If so Pecham may have acquired some knowledge of charge and discharge accounting then. This, however, is only speculative.

4.4. To guilds and boroughs

Guilds

Craft guilds, such as the guild of weavers, occur in Henry I's reign at, for example, Huntington, Lincoln, London, Oxford and Winchester. The guilds operated independently of the Crown but paid a yearly farm at the Exchequer through the sheriffs. Thus, at Andover in Henry II's reign 'the men of Andover render account of 10 marks for having their guild liberties, as have the men of Wilton and Saresberia in their guild'.[14] (Gross, 1890: 3 from Pipe Roll 22 Henry II Rot.13a). From the late 12th century/early 13th century onwards there are many examples of internal guild accounts using charge and discharge principles and terminology (Gross, 1890). At Leicester 1197–1198 individual guild members were all *quietus* of their introductory payments while at Lynn Regis in 1287 the officials formally rendered account (Gross, 1890: 153). In 1435, the Worshipful Company of Grocers accounts were clearly presented in charge and discharge format (Boyd, 1905: 61).

Boroughs

The origins of local government accounting is traceable directly to the Exchequer. In the earliest Pipe Rolls, the sheriffs rendered the accounts of certain towns and bailiwicks separately (e.g. Berkhamstead, Colchester, Lincoln, Meon, and Winchester) at the end of the counties to which they belonged. However, even in the 12th century London and Middlesex were treated as indivisible (Poole, 1912). The towns were granted charters by the King such as Ipswich in 1200. Typically, as at Ipswich, following the charter, two burgesses were to report annually to the Justiciar at the Exchequer and to pay the '*firma burgi*' (farm of the borough) (Gross, 1890: 7).

The knowledge was diffused from the Royal Exchequer by the sheriffs, who originally rendered the borough accounts, acting as change agents. Boroughs naturally imitated the practices of the higher status Exchequer. As local government developed, the essentials of Exchequer accounting were retained (see, for example, early English and Scottish borough, guild and parish accounts). Accounting texts also seem to have played a part in the diffusion of accounting. By the late 13th century, some boroughs such as the City of London, Lincoln, Norwich and Hereford had copies of accounting texts (Oschinsky, 1971: 51–53).

The earliest borough records extant are from Shrewsbury (Accounts of the Borough of Shrewsbury, 1899) in 1256 and from Leicester in 1277 (Bateson, 1899).[15] In 1277, there is evidence at Leicester of the rendering and auditing of the annual accounts (Bateson, 1899: lvii). The first mayorial account of William the Palmer extant in 1300 is certainly characteristic of charge and discharge accounting. A list of receipts (e.g. from tallage £114 3s 9d) less a 'sum total of expenses, £113 6s 8d' led to the discharge and 'so he owes clear 17s 1d, besides £4 which still stand over in claim' (Bateson, 1899: 237).

4.5. To the university sector

The universities of Oxford and Cambridge slowly came into existence in the 13th century. The early colleges, such as University, Merton and Balliol, College, Oxford, were quasi-religious in nature. Merton, for example, was founded 'for the profit of the holy Church of God'.

The administrative and funding structures of the early colleges resembled religious establishments. Aston and Faith (1984: 307) comment:

> 'As corporate landlords of estates consisting of scattered collections of lands, manors, churches and urban property, Oxford's colleges had much in common with religious houses; they received similar kinds of revenues and faced much the same administrative problems.'

Their financial administrative systems thus naturally imitated the centralised audits and charge and discharge type accounts typically found in ecclesiastical institutions.

In terms of internal governance, the new colleges, like monasteries, were governed by statutes (Highfield, 1984: 244). The three early founders of Merton, Exeter and Oriel were all churchmen, and appear to be important agents of change. This is particularly true of Walter of Merton, Bishop of Rochester who founded Merton College, Oxford in 1264 as an autonomous self-regulating body. Merton, a financial administrator, was well-acquainted with the Exchequer from his service as King Henry III's Chancellor (from 1261–1263, 1272–1274). The 1264 statutes required an annual audit of the warden's work by eight or ten senior scholars (Martin, 2004). The bailiffs' and land agents' accounts were also audited (Allen and Garrod, 1928). The first two visitors, the Bishop of Winchester in 1264 and the Archbishop of Canterbury from 1266, both had first-hand knowledge of their own Episcopal Exchequers. Interestingly, at Merton, these visitations were conducted by Archbishop Pecham in 1284 who between 1281 and 1284 had instituted central treasuries and auditing committees in 13 religious houses. By 1291, there was a fire-proof treasury

[14] '*Homines de Andeura reddunt compotum de X. marcis pro habenda eadem Libertate in Gilda sua, quam homines de Wiltona et Saresberia habent in Gilda sua.*'

[15] In Scotland too, clear evidence exists of the evolution of borough accounting (e.g. Boyd, 1905 on borough of Stirling 1326, 1327–1328).

and exchequer chamber at Merton with 'a literal chequer-board table [*mensa computatoria*] for reckoning accounts', which served as a counting-house and estates office (Martin and Highfield, 1997: 45).

Of the early colleges, Merton's statutes of 1264, and particularly 1274, were the most influential. 'The pattern of the Merton statutes (the "*Regula Mertonensis*") was followed, deliberately by Peterhouse, Cambridge and Oriel College, Oxford and effectively by all subsequent English university colleges' (Franks, 2003: 116) (e.g. at Oxford: University College (1292), Oriel (1326), Balliol (1340); at Cambridge, Peterhouse (1274) (Highfield, 1964).

The approach of Merton College in the 13th century to the internal and external college administration is illustrative. The overarching administration was in the hands of the three bursars and the warden. The warden was the estate administrator, supervised the audit and visited the manors at harvest time. The audit, as at the Royal Exchequer, consisted of a mid-year view and a more formal, detailed audit. In the 1274 statutes, the auditors were the warden, the vice-warden, the three bursars and five fellows. At Merton, unusually, the accounting year was July to July rather than the more conventional Michaelmas to Michaelmas.

Overall, the early 13th-century colleges exemplified by Merton, broadly followed the accounting system set up at the Royal Exchequer and subsequently imitated by monasteries. They had landed estates run by stewards, bailiffs and reeves under the supervision of the wardens and fellows. They had a centralised audit which resembled the Exchequer audit in its use of accounting rolls, tallies, Latin, Roman numerals, an interim audit and a final audit. In addition, the manorial accounts themselves were drawn up in charge and discharge format as developed at the English Exchequer.

4.6. To parishes

The parish was a key, if low level, ecclesiastical administrative unit in the early middle ages. Accounts were kept by the churchwarden, the constable, the highway wardens, the overseer of the poor and most importantly by the churchwardens. Early records are at Jarrow in Durham (1303–1537) and St. Michael, Bath (1349–1575). 'Charge and discharge statements were presented, annually, for approval by the parishioners' meeting in the church vestry, and the balance on hand was delivered up or handed over to the new officers' (Edwards, 1989: 41). These accounts share the same basic classical charge and discharge principles of Exchequer accounting (Jones, 1985). The source of parochial accounting is uncertain. It probably developed through the ecclesiastical route. It represented the final diffusion of charge and discharge accounting from the higher levels to the lower levels of society. Church officials are the most likely change agents.

The diffusion of accounting practices, thus, appears to have been in four or five overlapping waves. First, the practices spread to other state Exchequers in the 12th century starting with Normandy in the 1130s. Second, English religious institutions such as Winchester Cathedral Priory adopted them before 1200. Third, there was the adoption of centralised Exchequers on lay estates from about the mid-13th century and on ecclesiastical and lay manors from 1208–1209 onwards. In the fourth wave, there was adoption by the guilds, boroughs and universities from the early 13th century onwards. Finally, parishes adopted charge and discharge accounting from probably the start of the 14th century.

5. Discussion

From the pattern of diffusion it is possible to draw certain inferences about how this accounting innovation spread and the role played by change agents. The first broad conclusion is that, like the spread of accounting qualifications throughout the British Empire (Johnson and Caygill, 1971) and the spread of voluntary reporting in the Netherlands from 1945–1970, the innovation originated in an influential, high status institution and was then adopted by other smaller, less influential institutions. It thus had elements of both mimetic and normative institutional isomorphism. Mimetic in that performance would improve by copying apparent success, but also normative in that institutions would conform to established societal norms and values by copying (Tuttle and Dillard, 2007).

With charge and discharge accounting the originating organisation, the English Exchequer, was probably the most efficient and respected financial administration in Western Europe. It was emulated by other countries and also by leading English institutions. It is particularly noteworthy that the largest and richest estates such as those of the Earl of Gloucester and the Bishops of Canterbury and Winchester were among the earliest adopters. For example, the Earl of Gloucester was one of the top five greatest estates in the realm (Campbell, 2003). These estates, therefore, had the resources to adopt and adapt Exchequer accounting. Once these high profile, ecclesiastical leaders had adopted the Exchequer system it gradually diffused to other less high status religious institutions. The innovation then gradually spread down the social scale to smaller estates, guilds and parishes.

There was also a geographical element to the diffusion. Abroad, charge and discharge accounting was adopted in geographically proximate states such as Normandy, France or Scotland. In England, innovation occurred first in Winchester,

at Winchester Cathedral Priory, the city where the original Exchequer was held. It then spread throughout the South of England (e.g. Canterbury, Waltham). The adoption by manorial accounts is particularly clear on the Winchester Bishopric estates in 1208–1209. By the final quarter of the 13th century standardised, written manorial accounts were common in Southern England and East Anglia. There was slower diffusion to the North (Campbell, 2003). In guild accounting too, there was a gradual diffusion, this time from certain hub towns, of which interestingly Winchester was one (Gross, 1890).

The role of change agents can also be identified in the spread of charge and discharge accounting. Individual groups of people, especially key specific individuals, can be directly or indirectly implicated in the initial spread of the accounting innovation while the role of estate management treatises is likely to have played an important part in its continuing spread.

L.M. Parker (1989) identified Jewish traders as important change agents in the diffusion of double entry bookkeeping. However, it was ecclesiastics, magnates, sheriffs, stewards and lawyers who were the main change agents in the diffusion of charge and discharge accounting. Ecclesiastics and magnates were particularly important in its initial spread. They were leaders in society, men of great influence and power who were well-networked. Such networks of inter-personal communications are central to the adoption of new innovations (Jackson and Lapsley, 2003: 365). These magnates were influential in the spread of Exchequer accounting to the early monasteries and to the large estates. Once the initial phase of innovation had passed, then it was the sheriffs, stewards, lawyers as well as lesser ecclesiastics and smaller landlords that contributed to the spread of charge and discharge accounting to the English boroughs and manors.

Within these groups, it is possible to identify certain key individuals who were specifically implicated in the diffusion of accounting practice. There were many such potential change agents, given that many individuals had knowledge of exchequer practice. It is probable that these key individuals were present at the right place at the right time.[16] Table 1 outlines 10 main identifiable human agents of change. Roger of Salisbury developed the Royal Exchequer in about 1110 and is clearly the first change agent. Henry of Blois, Baldwin of Forde, and Peter des Roches were important in establishing exchequer systems at Winchester Cathedral Priory, 1153–1171, Christchurch Canterbury before 1200 and the bishopric of Winchester about 1208, respectively. Walter of Merton founded Merton College, Oxford, the leading Oxbridge innovator in 1264 with an annual audit. John Pecham, Archbishop of Canterbury, is credited with introducing centralised audits into many British monasteries 1281–1284 as well as probably playing a role in introducing Exchequer accounting to the nascent universities as a visitor at Merton. Meanwhile, Aymer Lusignan insisted that the Winchester monks used the episcopal Exchequer at Wolvesey. Finally, three laymen, Robert Earl of Leicester, Robert Earl of Gloucester and Edward, the Black Prince, set up Exchequers at Leicester, Gloucester and Westminster, respectively.

These individuals share certain characteristics. First, they were all leading magnates or ecclesiastics. Of the ten, seven were bishops, while three were lay magnates. Eight of the ten (the Bishops of Winchester, Archbishops of Canterbury, Robert Earl of Gloucester, Robert de Beaumont, Earl of Leicester and the Black Prince) were among the top landowners in England. These men of wealth, influence and power were among the natural leaders of the early Middle Ages which was a comparatively close knit community and were well networked into English society. There were, for example, only about 8 to 13 Earls in Britain in 1300 (Campbell and Bartley, 2006: 70). Second, as a consequence of their substantial property portfolios (for example, 11 Earls from 1300–1349 controlled 454 manors (Campbell and Bartley, 2006: 70, 75) these magnates urgently needed a workable and sophisticated system of financial administration. Early adoption of Exchequer-based accounting was thus logical. Third, many of these men had important posts within the English government, many within the Exchequer itself. Roger of Salisbury and Peter des Roches, two of the most important change agents, were justiciars, while Walter of Merton was a Chancellor. Robert Earl of Gloucester reformed the treasury. Most of the others were acquainted with Royal administration and were familiar with the workings of the Royal Exchequer to varying degrees. Still others were also familiar with other existing Exchequers such as the episcopal Exchequers at Winchester or Canterbury. Fourth, these men can be shown to have played some part in overseeing the development, establishment or the perpetuation of Exchequers at court, on ecclesiastical estates or on lay estates.

Once these Exchequers had been set up, charge and discharge accounting then filtered down to the next level of society – small manorial estates, guilds and parishes. It is not possible here readily to identify specific individuals as agents of change. These men, generally, would have been minor ecclesiastics, lords of the manor, accountants, lawyers and stewards. One example might have been Adam of Ely, an administrator on the

[16] I am grateful to the editor, Pauline Weetman, for this point.

Table 1
Main identifiable human change agents

Individual	*Brief background*	*Role in diffusion of charge and discharge accounting*
Roger of Salisbury, Bishop of Salisbury (1065?–1139)	Born probably Normandy. Enters Church at Caen. Service Henry II. Becomes Chancellor. Manages Royal finances at Winchester. Founds powerful ecclesiastical and governmental dynasty (Kemp, 2004).	Developed Royal Exchequer c.1110.
Robert de Beaumont, Count of Meulan, First Earl of Leicester (c.1047 – 1118)	Inherited lands in France. Supports William II and Henry I. Constant at court. 1107 granted Earldom of Leicester (Crouch, 2004a).	Created a Baronial Exchequer by 1118.
Henry de Blois, Bishop of Winchester (c.1096–1171)	Son of Count of Blois and Adela (William I's daughter). Monk at Cluny in Burgundy. Appointed Abbot of Glastonbury by uncle, King Henry I. Bishop of Winchester 1131–1171. Succeeds Roger of Salisbury as Dean of St Martins-le-Grand, an active centre of Royal administration (King, 2004).	Established centralised audit at Winchester Cathedral Priory c.1153–1171.
Robert Earl of Gloucester (b. before 1100–1147)	Illegitimate son of Henry I. Magnate, land owner England, Normandy. At Royal court of Henry I and Stephen. Reformed treasury 1128–1129.	Copied royal administration. His family established a Baronial Exchequer at Gloucester by 1183.
Baldwin of Forde Archbishop of Canterbury (c.1125–1190)	Probably son of Archdeacon of Totnes. Succeeds father. Cistercian monk. 1173 helps to make peace between Henry II and sons. Bishop of Winchester 1180; Canterbury 1184 with King Henry II's support (Holdsworth, 2004).	Probably established Exchequer system at Christ Church, Canterbury.
Peter des Roches, Bishop of Winchester (d.1238)	Born in France. Early career in Church in North-West France. Military reputation. Joins King John's financial household and nominee for Winchester 1205. In 1213 de facto Royal Chancellor. February 1214, King's chief Justiciar. 1216 active in Royal Exchequer (Vincent, 2004c).	Introduced an episcopal Exchequer at Wolvesey Castle, Winchester about 1208. Bishop of Winchester (1205–1238).

Table 1
Main identifiable human change agents *(continued)*

Individual	*Brief background*	*Role in diffusion of charge and discharge accounting*
Aymer Lusignan, Bishop of Winchester (c.1228–1260)	Born in Poitou of Isabella de Angoulême (widow King John). In 1246, joins Church. Studied at Oxford. King's appointee against monastic opposition at Bishopric of Winchester. King's half brother (Vincent, 2004a).	Insisted Winchester monks use episcopal Exchequer at Wolvesey 1253.
Walter of Merton, Bishop of Rochester (1205–1277)	Initially, a clerk, legal training. Enters King's service 1234. Serves in Durham episcopal chancery. Henry III's Chancellor 1261–1266. 1274 Bishop of Rochester. Edward I's Chancellor 1272–1274 (Martin, 2004).	Founded Merton College in 1264 with annual audit.
John Pecham Archbishop of Canterbury (c.1230–1292)	Educated in France. Friars Priory 1250s. Paris, Oxford. Prior of Franciscan province in England. Acquainted with Royal, papal administration. Archbishop of Canterbury 1279. Used Christchurch, Canterbury treasury as model for reforming other monasteries (Thompson, 2004).	Introduced central treasuries and auditing committees in 13 religious houses 1281–1284. Visitor at Merton College, Oxford in 1284.
Edward, the Black Prince (1330–1376)	Eldest son of Edward III. Earl of Chester. Runs an independent household, many Royal officials in service. Heir to throne, military commander (Barber, 2004).	Maintained independent Exchequer in 14th century at Chester and, presumably, Cornwall, Wales and Aquitaine. Set up an Exchequer at Westminster 1343–1334.

Earl of Gloucester's estates. At this level, the existence of estate management treatises and accounting texts, by such individuals as Robert Carpenter and William Hasely, appear to have played a role. A text written about 1260 by Robert Carpenter is especially interesting because of a diagram of an exchequer board and detailed information about the tally system. These texts can thus be identified as change agents. Many of the boroughs and ecclesiastical institutions had libraries well-stocked with religious and non-religious texts. An interesting possible insight into the potential role played by such libraries is given from details of the earliest known owner of such works. Canterbury Cathedral Priory, for example, an early adopter of Exchequer accounting had four copies of Walter of Henley, three copies of the Husbandry, one copy of the Rules of Robert Grosseteste and two copies of accounting texts, one by Robert Carpenter (calculated by author from Oschinsky, 1971: 51–55). These texts were thus widely copied, read and distributed. Estate management was also taught at the universities.

Accidents of history also appear important. The Exchequer system spread to Normandy, ruled by English kings at the start of the 12th century. With Philip Augustus's conquest of Normandy in 1204, the Exchequer system was adopted by the French state. Its introduction at Waltham Monastery in about 1177 was a by-product of King Henry II's refoundation. Similarly, the fact that the bishops of Winchester attended the Royal Exchequer and that the treasury was based at Winchester contributed to the adoption by Winchester Priory and the Bishop of Winchester's household of centralised exchequers.

6. Conclusion

Charge and discharge accounting, the predominant accounting system of the Middle Ages, was first developed at the English Exchequer under Henry I, most likely by Roger of Salisbury. This system was characterised by the annual rendering of an account, personal accountability, an audit, a formal meeting, a formal charge and discharge of officials and written records. 'Central control of revenue and expenditure was a feature common to Royal, episcopal, monastic, and lay households, and the exchequer procedures of all four administrative systems differed in matters of detail rather in general principles' (Smith, 1941: 92–93).

Overall, the evidence available suggests that once charge and discharge accounting had been developed at the English Exchequer in about 1110 it proved extremely successful. The governments of Normandy, Scotland, Flanders and France imitated the English Exchequer system by the start of the 13th century. In all these cases, the national Exchequer appears to have followed a relatively standard 'English' pattern. An annual audit by the king's central officials of regional officials (equivalent of sheriffs) to account for the king's regional revenues was accompanied by written records and characterised by personal accountability. The English model appears to have been an attractive model because of its evident superiority, as the most advanced financial administrative system in western Europe.

Within England, Exchequer accounting was first imitated by religious institutions, such as the Winchester Cathedral Priory (1153–1171), before its widespread adoption by lay estates from the middle of the 13th century (e.g. Lord Edward's estates from 1254) and by the universities from at least 1274 onwards (Merton College, Oxford). Meanwhile, at the manorial level charge and discharge type accounting (with or without a centralised Exchequer) emerged from the start of the 13th century. From 1208–1209 onwards, there was a steady spread of manorial accounts. Finally, the boroughs, guilds and parishes began to adopt charge and discharge accounting: the boroughs from at least the late 13th century, the guilds from at least 1435 (although probably much earlier) and the parishes from the early 14th century.

All in all, therefore, charge and discharge accounting proved remarkably pervasive. Gradually, it appears to have spread from state governments to religious institutions, to lay institutions and to local government. It slowly, but inexorably, diffused from the higher to the lower levels of society. Lower level institutions gradually imitated their superiors. It was adopted first by the major ecclesiastical and lay estates, then by other less significant economic and religious institutions.

There were two main change agents active in this diffusion process: individuals and books. In the immediate transference of the innovation from the English Exchequer to leading ecclesiastical and lay institutions, leading magnates and ecclesiastics, both as a group and also as specific individuals, can be identified. These men of wealth and power generally had important posts in the English government or were familiar with the workings of the Royal Exchequer or other existing exchequers. They happened to be in the right place at the right time. For example, Peter des Roches, Bishop of Winchester was instrumental in the adoption at Winchester of manorially-based charge and discharge accounting, while Archbishop Pecham of Canterbury, which adopted a centralised Exchequer before 1200, was instrumental in the spread of Exchequers to religious institutions. After this initial transfer other less influential men would have played key roles such as lords of the manor, stewards or accountants. These men are not specifically identifiable because of the lack of historical evidence. At this second diffusion phase, widely circulated treatises on estate management and accounting are likely to have been used as didactic texts.

Finally, there is some evidence of the role played by geographical proximity and accidents of history. Winchester, home of the Royal Exchequer, formed a natural pivot for the spread of charge and discharge accounting. From Winchester, there is a well-charted diffusion of manorial accounting to the south of England. In the French case, Exchequer accounting appears to have been 'borrowed' from Normandy after the latter's conquest in 1204.

Overall, therefore, the diffusion of the charge and discharge accounting system can be tracked from the English Exchequer to other European states and also to other English institutions. The mechanisms and methods of diffusion are often complex. However, imitation, change agents (such as individuals and books), geographical proximity and accidents of history all play their part.

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Occupational differentiation and exclusion in early Canadian accountancy

John Richard Edwards and Stephen P. Walker*

Abstract—Canada's 1881 census enumerators posed a range of questions that provide scope for an in-depth investigation of the identity of its accounting functionaries (accountants and bookkeepers) in that year. The significance of our findings is explained by applying the concept of closure through exclusion and occupational differentiation. We discover that Canada's accounting community, at the dawn of professional organisation, was dominated by people originating from Great Britain & Ireland. The rural/urban divide for Canada's accountants is the inverse of that for the population as a whole and, as in Britain, congregation occurs around the major commercial ports. Significant differentiation exists between the demographic profile of Canada's accounting functionaries compared with its entire population and between that of accountants compared with bookkeepers. Strong evidence of exclusionary closure is revealed through an analysis of the demographic characteristics of the initial leaderships of Canada's early accounting associations. The paper concludes by identifying opportunities for further research.

Keywords: accountants; bookkeepers; closure; census; Canada

1. Introduction

A recent review of the literature on accountancy's professionalisation has drawn attention to plenteous studies of the formation, operation and geographical spread of professional bodies in the late-19th and early 20th centuries (Poullaos, 2008). Leading figures within the accountancy profession have also proved a popular subject for study either as individuals (Lee, 1996) or groups (Carnegie et al., 2003). However, a proper understanding of the accountancy profession post-organisational formation, and the difficulties it has faced such as boundary definition and 'problematical institutional configurations', requires a 'holistic frame of reference' which extends 'the scope of historical studies to the occupational populace as a whole, beyond the memberships of the elite professional bodies' (Edwards and Walker, 2007a: 64, 65; see also Cooper and Taylor, 2000).

A start has been made towards studying entire accounting communities both pre- and post-organisational formation. Lee (2007: 333), for example, has drawn attention to the fact that 'little is known about the community of American accountants that existed prior to the main foundational events of the 1880s and 1890s', and his paper is intended to help fill that space. Britain is another country where the emergent accounting occupational group has been the subject of attention: Walker (2002) investigates the social standing of accountants in certain parts of England in the early-Victorian period; Edwards et al. (2007) examine the creation of a jurisdiction for the public accountant in England during the 19th century; Edwards and Walker (2007a) supply a spatial, demographic and occupational profile of professional and non-professional accountants in Britain in 1881.

The present investigation, located in time just two years after the formation of professional bodies in Montreal and Toronto, has similarities with Edwards and Walker (2007a), given that most accountants in each location then remained free from institutional affiliation.[1] The Association of Accountants of Montreal, formed on 11 June 1879, secured the CA credential for its members through a charter granted by the Quebec legislature on 24 July 1880 (Collard, 1980: 18), while The Institute of Accountants and Adjusters of Canada, based in Toronto, came into being in December 1879 (Creighton, 1984: 6).[2] Numbers for the initial membership of these bodies appear not to be avail-

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[1] Qualified accountants comprised just 7.3% (1,189 out of 16,180) of the British accounting community in 1881 (Edwards and Walker, 2007a: 83).

[2] It was reconstituted as a specialist organisation for accountants called the Institute of Accountants, Province of Ontario, in May 1882 (Institute of Accountants, Province of Ontario, 1882), receiving royal assent for its act of incorporation on 1 February 1883.

able (Collard, 1980; Creighton, 1984), but they certainly accounted for a relatively small proportion of known accountants and a minute fraction of the nation's accounting functionaries in 1881.

Central to this paper is an examination of the spatial and demographic (nativity, ethnicity, religion and gender) characteristics of those included and, by comparison with the profile of the population from which they were drawn, those excluded from the accounting occupational group. Given the difference in economic and social status typically enjoyed by accountants and bookkeepers, the data will also be interrogated for evidence of variations in the common characteristics of these two components of the accounting occupational group. The broader significance of our findings is explained by applying the concept of closure through exclusion and occupational differentiation.

The remainder of the paper is organised as follows. First, we consider how the concept of closure can aid our understanding of the shifting occupational landscape inhabited by accounting functionaries in the late-19th century. To contextualise our study, we next examine the economic and social environment within which Canada's accounting community became visible. Then we consider the background to the 1881 census, how it was conducted, and the way in which census data has been exploited for the purpose of the present study. Subsequent sections contain an in-depth, empirical analysis of the profile of accounting functionaries in Canada, in 1881, so far as these can be discovered from the available census records. In doing so, we identify the characteristics of those who gained admission to the accounting occupational group and, by comparison with the profile of the community as a whole, those destined to remain outside. Concluding remarks summarise our findings and identify opportunities for further research.

2. Closure in a shifting occupational landscape

The history and transformation of occupational and professional groups has been the subject of significant study within the sociology literature (Abbott, 1988, ch. 1; Macdonald, 1995, ch. 1). Writers have adopted a range of different and competing interpretive lenses (such as critical, ecological, functionalist, interactionist and positivist) to better understand the history and state of the occupational landscape. Their rival explanations, in the market for academic hegemony, intersect in key areas such as occupational trajectory, closure and conflict, though the protagonists sometimes appear unwilling to recognise this to be the case (Macdonald, 1995: 14–17).

Larson (1977: 66) believes that 'the structure of professions results from two processes: the process of organisation for a market of services, and a process of collective mobility by which the early modern professions attached status and social standing to their transformed occupational roles'. Randall Collins, who cautions against classifying writers on the basis of theoretical standpoints (Maclean and Yocom, 2000), makes similar points: 'Instead of seeing occupations as having fixed positions on a market, we see that occupations themselves can become status groups in the realm of work' (Collins, 1990: 25). The upward trajectory of certain occupational groups produces a history of work marked by a continuously changing landscape and a 'graveyard' of failed 'occupational and professional groups' due to changes in technology and in the 'broader organization of society' (Krause, 1971: 1–2). Abbott's (1988: xiii) distinctive paradigmatic framework similarly 'aims to show [and understand] professions growing, splitting, joining and dying'.

To help underpin a strategy of upward trajectory, occupational and professional groups attempt to exploit opportunities for exclusionary closure; see, for example, Richardson (1997) for a closure-based study of the Canadian public accounting profession from the early 19th century through to recent times. A strong and explicit form of closure occurs when the practice of a discipline, e.g. medicine, is restricted by law to a group of 'eligibles'. It might also be the case that performance of a specific task (e.g. company audit) is confined to identified practitioners. The 'critical' literature on professionalisation is marked by a Weberian-inspired focus on social closure that has highlighted the role of organisations (Willmott, 1986) in progressing professional projects through the exclusion of undesirable 'others', often on the basis of perceived status within an occupational group (Walker, 2004). Such bodies have also used credentials such as CA and CPA to signal fitness to practice to the general public and business community. Often, however, exclusionary closure operates in a more subtle manner and not only through the agency of professional organisations.

Macdonald (1995: 28, emphasis added) reports that 'Weber's analysis [of occupational trajectory] draws attention to the way in which groups with interests in common, or even people *who share a religious belief, or have racial or other characteristics in common*, can act in such a way as to circumscribe their membership' in order to 'pursue their collective interest'. Whereas early commentators such as Previts and Merino (1979: 332) wrote that 'opportunities for individuals, regardless of sex, race, religion, or creed, to advance in the ranks of professional accounting and to gain significant status has been characteristic of the [US accountancy] profession from the earliest years', subsequent 'students of the accounting profession

have connected with, and drawn inspiration from, theoretical advances in the historiography and sociology of professions' (Walker, 1999: 1) to problematise the notion of an absence of barriers to entry.

The professionalisation literature on accounting has successfully employed the concept of social closure[3] to demonstrate inter-occupational differentiation between respectable and skilled accountants on the one hand and 'counterfeit accountants' on the other (Walker, 2004: 153). Within the same branch of the professionalisation literature, Kirkham and Loft (1993) reveal that demographic characteristics have been formally applied to achieve exclusionary closure on the basis of gender, and this has since become an important area of study (e.g. McKeen and Richardson, 1998; Walker, 2003; Khalifa and Kirkham, 2008). However, Davie (2005: 553) has expressed concern that, '[w]hilst racial and ethnic differentiation and discrimination themes have traversed social science analysis of everyday life, accounting researchers have been mostly remarkably silent on such issues'. But some work has been done. Hammond and Streeter (1994) use theories of racism to challenge the idea that public accountancy firms in the US have provided equality of opportunity, while Sian (2006) has shown how, following independence, Kenya's government enabled inclusionary usurpation through structural changes in professional organisation designed to transfer leadership from expatriate accountants to African Kenyans. Sian (2006: 297) also points out that 'more informal sanctioning at various points in a [professional] project (by powerful constituent groups) can also result in exclusion on the basis of race, gender, social class and wealth'. In the current paper we seek to demonstrate the operation of informal social closure to achieve exclusion through differentiation both within and between the occupational groups of accountants and bookkeepers.

Before we embark upon a study of the spatial and demographic characteristics of the accounting community in Canada in 1881, Sections 3–5 review the economic and business environment within which Canada's accounting functionaries worked in the period up to 1881, explain how the census was conducted and outline the research approach that we employ.

3. Economic and business environment

The early development of Canada's economy is predominantly associated with the fur trade and, in particular, the activities of the Hudson's Bay Company incorporated in 1670. It is certainly the case that fur was the single most important factor in the initial population of Canada's interior, but the earliest European settlements arose from fishing off the coast of Newfoundland and Nova Scotia. In the early 19th century, lumber became the dominant staple export to meet the requirements of a Britain that had exhausted local supplies. The timber ships fulfilled a further key role in Canada's history through the carriage of immigrants on their return voyage from the British Isles. The timber industry was in turn an important factor in the development of agriculture because, in contrast to the fur trade, the exploitation of woodlands entailed large numbers of people based in a single location for a substantial time-period. These lumber camps and towns needed to be supplied with food and other provisions. As the loggers pushed westwards, farmers followed to form the basis of new communities that often became permanent settlements.

In 1881, almost three-quarters of Canada's population was located in rural areas (Urquhart and Buckley, 1965: 14), and most of the workforce remained engaged in farming and other primary industries (Urquhart and Buckley, 1965: 59). Part of the reason for this orientation was because, historically, British mercantilist policies had discouraged Canada from developing its processing and manufacturing sectors:

> 'Under the French and for long under the British regime, it remained the kind of colony that had been envisaged by seventeenth century mercantilist philosophers, acting as both a source of raw materials for the Old Country and a market for its manufactures' (Woodcock, 1989: 315).

The repeal of the Corn Laws (1846) gave rise to 'a cumulative series of political and economic changes in Britain [which] precipitated the abandonment of the system of colonial preferences' (Easterbrook and Aitken, 1956: 377). This compelled Canadian industry to become more efficient and to try to cultivate new markets, necessitating the development of innovative strategies fundamental among which 'was the manipulation of the tariff and the construction of railways' (Easterbrook and Aitken, 1956: 377). What was later captioned 'old industrialism' (Easterbrook, 1959: 77) first appeared in Canada in the form of improvements to the transportation network through canal and railway construction capable of lowering transportation costs and converting the maritime provinces' seaports into outlets for western trade.

Despite the continued, overwhelming focus on primary industries through to 1881, the economic activities of Canada's provinces showed signifi-

[3] Occupation-based cases are of course micro-illustrations of much broader societal developments where, historically, 'exclusionary forms typically arose as a result of the conquest of one collectivity by another' (Murphy, 1988: 219).

cant variation. Staple extraction dominated in the three Maritime provinces – New Brunswick, Nova Scotia, and Prince Edward Island. There, the 'export of fish, wood, and coal provided the region with exchange to purchase food and manufactured imports from abroad' (Taylor and Baskerville, 1994: 109). Woodcock (1989: 300) explains the fragmented nature of Canada's provinces until Confederation (1867):

> 'disparate colonies ... did not have the social and commercial infrastructures that could produce large cities. On the Atlantic seaboard the Maritime colonies carried on their commercial activities more or less independently of the more inland provinces, to which they had no year-round transportation links until the Intercontinental Railway was completed in 1876. They traded with the United States, Britain and the West Indies rather than with the two Canadian provinces, and acted largely as entrepôts for trades that were dominated by merchants in London.'

The continued focus on trade among the Maritime Provinces was not only a consequence of British trading priorities. As noted above, the British mercantilist philosophy had, by 1881, been long replaced by one of free trade. However, a sustained mercantilist orientation was favoured by the indigenous merchant class in leading commercial centres such as Halifax, Nova Scotia and St John, New Brunswick. Initiatives to encourage industrialisation were resisted by merchants as likely to create unwelcome 'potential competition in the sense that local production would diminish the flow of imported manufactured goods and thus cut into their profits' (Taylor and Baskerville, 1994: 112). The industries that were allowed to develop – shipbuilding, lumber, coal and fisheries – did so under the aegis of merchant capital.

The overall level of industrialisation was greater in Ontario and Quebec, but the rural/farming community remained dominant even there. In 1870, two-thirds of all workers in Ontario remained in farming, but 'old industrialism' was underway through continued railway building and ongoing improvements to the waterway network linking major urban sites adjacent to the St Lawrence seaway through to Lake Erie. In 1870, Ontario was home to 51.8% of Canada's industrial production, much of which was located in Toronto and Hamilton. Businesses were normally small scale; 18,600 of Ontario's 21,730 industrial establishments employed five or fewer workers (Taylor and Baskerville, 1994: 177). There were exceptions, however, with the Grand Trunk and Great Western railways' repair and locomotive-building plants 'the first large integrated – manufacturing, transportation, communication – industrial corporations to operate in Canada' (Taylor and Baskerville, 1994: 180).

Manufacturing activity was also beginning to surface in Quebec by 1870, and it occurred on a more centralised basis than at its western neighbour. Thirty-nine of Canada's top 150 industrial firms were located in Montreal compared with 14 in Toronto. Indeed, Montreal was responsible for 43%, in value, of the province's industrial output, Quebec City for 9% and all other urban centres just 12%. Some of its businessmen were highly ambitious. By using the latest American steam-powered technology, for example, the Montreal Rolling Mills' directors hoped to 'bid defiance to all foreign competition' (quoted in Taylor and Baskerville, 1994: 223). Such instances remained important exceptions to the continued agrarian focus until the implementation of the National Policy that Sir John A. Macdonald trumpeted during the federal election of 1878. This was 'directed towards bringing the Industrial Revolution into Canada and making it something more than a nation devoted to the primary industries of farming, fishing, mining and logging' (Woodcock, 1989: 302; see also McDougall, 1971). To help this process, the government quickly put in place 'a more complex tariff structure in which particular attention was given to protection of goods which were manufactured or which could be manufactured in Canada' (Easterbrook and Aitken, 1956: 393).

Canada's two remaining provinces in 1881 – Manitoba and British Columbia – remained remote from the Maritime Provinces and the more urbanised areas of the two Canadas. Indeed, they were not part of the initial Confederation; Manitoba being ceded to Canada by the Hudson's Bay Company in 1870 and British Columbia joining in 1871. Both these areas were for many years controlled by the North West Company or the Hudson's Bay Company, with their economies dominated by the fur trade until the Fraser Canyon Gold Rush of 1858 began to change the character of British Columbia.

From this review, we might conclude that accountants and bookkeepers in Canada, in 1881, were unlikely to have been heavily involved in servicing the accounting needs of manufacturing industry either directly, as employees, or indirectly as public practitioners.[4] Canada was still predominantly a rural-based, agrarian economy, under the control of its wealthy merchants, with its primary industries providing the source of external trade. As the social historian George Woodcock (1989: 305) put it, even 'Canada's largest cities

[4] Even in 1891, 46% of the workforce was engaged in agriculture with just 14% classified as manufacturing and mechanical workers (Urquhart and Buckley, 1965: 59).

have really been mercantile ones characterised by the concentration of economic power and social function'. The merchants' wealth and power was expressed in conspicuous consumption. In Montreal, for example, from 1850 onwards, builders began constructing large mansions at the foot of Mount Royal in an area known as the Golden Square Mile as merchant families began to migrate out of Montreal to settle in the suburbs (Rémillard and Merrett, 1987).[5]

It was within this economic and social context that Canada's census takers undertook their work in the second half of the 19th century.

4. 1881 Canadian census

The first population census for New France was conducted in 1666 and revealed 3,215 inhabitants of European descent.[6] An Act of 1851 provided for a census of Canada in 1852, another in 1861 and decennially thereafter (Urquhart and Buckley, 1965: 1). When the British colonies in North America were united under the British North America Act to become the Dominion of Canada in 1867, census taking became a constitutional requirement. Also in that year, the Province of Canada was divided into Ontario and Quebec so that each linguistic group (English and French) could have its own geographical identity. As further provinces joined the Confederation – Manitoba (1870), British Columbia (1871) and Prince Edward Island (1881) – they were included in federal census returns.

When planning the 1881 British census, its administrators commented as follows:

> 'The success of the coming Census of the Motherland will be hailed with interest not only by her own people, but by the growing millions in her Colonies across the Atlantic, or in the Southern hemisphere where a like Census is taken to fill up the roll of the English race' (RG27/5, fol. 43; see also, Goldscheider, 2002: 79–83).

Canada's 'like Census' was held on the same date as its British counterpart – 4 April 1881. Care was taken in the *Instructions to Enumerators* (1881) to try to ensure their accuracy and to combat possible bias, with the enumerator 'going personally from house to house, and writing in the schedules, in the most scrupulous manner, the answers given to the questions arising out of the headings, in order of their numbering' (http://www.prdh.umontreal.ca/1881/en/enum.html). Schedule 1, entitled 'Nominal return of the living', contained 20 questions, with answers to questions 11–14 central to this study because of their potential for identifying possible bases for occupational differentiation and exclusion. These questions dealt with: country or province of birth, religion, ethnic origin, profession, occupation or trade.[7]

5. Sources and method

According to Lisa Dillon (2000: 185) of the Institute of Canadian Studies: 'At the beginning of the twenty-first century, the field of historical demography has acquired new energy through the proliferation of historical census micro data projects'. A key first step in improving accessibility to information about Canada's population occurred when approximately 1,500 volunteers, most of whom were members of The Church of Jesus Christ of Latter-day Saints, extracted Canadian census information from microfilm and photocopies of the original census forms. A team of genealogists from the Church and the Institute of Canadian Studies 'cleaned' the data – a process of standardising names and localities, and organising the material for easy retrieval. The Church released the database as a set of five CD-ROMs (Family History Resource File, FHRF Canada 1881)[8] in March 2002 and, later that year, the online version was made available on the FamilySearch Internet Genealogy Service Web site. The transcribed database contains 4.3 million individuals.

For the purposes of this study, FHRF Canada 1881 was interrogated using the search words 'accountant' and 'comptable' together with possible variations in spelling. This identified 876 individuals. Comparable data for the 3,698 bookkeepers (occupation code 33210) were extracted from the database constructed as part of the North Atlantic Population Project (NAPP, 2004). The stated purpose of this project is 'to develop a web-based collaboration that will maximize the usefulness of these data for understanding the North Atlantic world as it entered [sic] the industrial age'.[9]

The remainder of this paper presents an in-depth, empirical analysis of the characteristics of accounting functionaries in Canada in 1881. Therein, it reveals the potential provided by Canada's census records for uncovering socio-demographic characteristics that formed the basis for informal closure practices. We start by examining the presence, and relative incidence, of accountants and bookkeepers in Canada's provinces and cities, and then proceed to consider their distribution between

[5] A similar pattern of relocation occurred in Britain (Thompson, 1988: 165).

[6] Statistics Canada, http://www.statcan.ca/english/about/jt.htm.

[7] It is recognised that census data does not provide an unproblematic representation of the population (Edwards and Walker, 2007b; Inwood and Reid, 2001; Mills and Schürer, 1996).

[8] Edwards and Walker (2007b) study the scope and limitations of information about accountants contained in the transcribed version of the British census enumeration books for 1881. Many of their findings apply equally to the content of FHRF Canada 1881.

[9] http://www.nappdata.org/napp/proposal_p2.shtml

Table 1
Numbers and densities of accountants and bookkeepers in Canada's provinces in 1881

	British Columbia	*Manitoba*	*New Brunswick*	*Northwest Territories*	*Nova Scotia*	*Ontario*	*Prince Edward Is.*	*Quebec*	*Total*
Population	48,885	64,845	321,248	10,978	440,560	1,924,271	108,911	1,358,650	4,278,348
Accountants	33	36	53	0	45	441	54	214	876
ranking	7	6	4	8	5	1	3	2	
Per 100,000	68	56	16	0	10	23	50	16	20
ranking	1	2	5=	8	7	4	3	5=	
Bookkeepers	43	56	193	4	289	2,051	54	1,008	3,698
ranking	7	5	4	8	3	1	6	2	
Per 100,000	88	86	60	36	66	107	50	74	86
ranking	2	3	6	8	5	1	7	4	
Ratio: Bookkeepers/Accountants	1.3	1.6	3.6		6.4	4.7	1.0	4.7	4.2

Sources: FHRF Canada 1881; NAPP; http://www.prdh.umontreal.ca/1881/en/1881freqs.html

the Dominion's urban and rural areas. Next, we explore the birthplace and ethnic origin of accounting functionaries. To further enhance our profile of Canadian accountants and bookkeepers, in 1881, we examine their religious denomination and relate religious conviction to ethnic origin. The position of women accounting functionaries is then reported. Before presenting our concluding remarks, we offer a case study that reveals evidence of both formal and informal exclusionary closure implicit within the demographic profile of the founders of Canada's early professional associations.

6. Spatial distribution of the accounting community in 1881

Table 1 gives numbers for accountants and bookkeepers living and working in Canada in 1881 analysed by province,[10] and relates those figures to population size.[11] Table 1 shows that accountants were most populous in the Provinces of initial organisational formation in 1879, with 441 (50% of all accountants) in Ontario and 214 (24%) in Quebec. When the distribution of accountants is related to population, the pattern changes markedly. The highest densities are found in British Columbia, Manitoba and Prince Edward Island, all with 50 or more accountants per 100,000 population. Ontario has just 23 accountants per 100,000 population and Quebec 16. Ontario (2,051, 55% of all bookkeepers) and Quebec (1,008, 27%) were also the Provinces with the highest numbers of bookkeepers and, together, they were the location of 82% of all bookkeepers compared with 74% of all accountants. Ontario was also home to the highest density of bookkeepers – 107 per 100,000 population, but both British Columbia and Manitoba exhibited higher levels of concentration than did Quebec.

Variations in the density of accountants in different locations[12] is likely to be attributable to a range of variables that include relative levels of commercial and industrial maturity and the social composition of particular neighbourhoods, with the middle class more likely to require the services of accountants than the working class. Other local-specific factors no doubt explain the relatively high density in certain places. For example, 27 of British Columbia's 33 accountants lived in towns (Vancouver, Victoria and Yale) to which tens of thousands of people flocked during the 1858 and 1861–62 gold rushes. The 29 (out of 36) Manitoban-based accountants resident in Winnipeg (FHRF Canada 1881) probably included many working for the province's thriving Hudson's Bay Company.[13] Between 1871 and 1885, the company's administration had moved from its historic York Factory site on Hudson Bay to Winnipeg as steamboats, then a railway (1878), linked it with the US. The company also opened its first departmental store in Winnipeg in 1881.

Table 1 also reveals considerable geographic variation in the numbers of bookkeepers compared with accountants, ranging from unity (54 of each) on Prince Edward Island to 6.4 in Nova Scotia. Such differences may well reflect variation between provinces in the nature of the work performed by bookkeepers and accountants. Alternatively, they might be attributable, at least partly, to etymological variation in the application of those descriptions to accounting functionaries' calculative tasks.[14]

Table 2 adds a further dimension to this analysis by focusing on the urban/rural divide. Whereas 74% of Canada's population lived in rural areas in 1881, each category of accounting functionary reveals a converse distribution – 75% of its 875[15] accountants and 74% of its 3,698 bookkeepers lived in urban areas. Ontario and Quebec were the most urbanised provinces (30% and 28% of their populations respectively) and it is where we also find, Manitoba accountants apart, the largest proportions of urban-located accountants and bookkeepers (NAPP, 2004). Moreover, within these two provinces, the vast majority of accounting functionaries were located on the St Lawrence Seaway through to Lake Ontario.[16] Quebec City, Montreal, Toronto and Hamilton, for example, being the home of 250 (29% of total) accountants and 1,444 (39%) bookkeepers (NAPP, 2004). It is likely, of course, that in rural areas, in particular, accounting and bookkeeping functions were often not undertaken by specialists.

The figures for accountants reported in Tables 1 and 2 included an unknown number who were

[10] The 1881 census revealed a population of 4,324,810 (Urquhart and Buckley, 1965: 14) compared with the 4,278,174 entries in the NAPP database. The main cause of the discrepancy is that The Church of Jesus Christ of Latter-day Saints failed to enter the Northwest Territories in full.

[11] Northwest Territories are included in the tables, for completeness, but ignored for analytical discussion given that only four accounting functionaries were located there.

[12] The null hypotheses that accountants and bookkeepers were distributed, by province, in the same proportions as the general population were overwhelmingly rejected in a chi-squared test ($P < 0.0001$).

[13] Forty of Manitoba's 56 bookkeepers were also resident in Winnipeg.

[14] There is evidence to suggest that, by 1881, less progress had been made in Canada, and the US, than in Britain in developing an effective linguistic distinction between the terms bookkeeper and accountant ('American book-keepers', 1880: 11; *The Book-keeper*, 1882 quoted in Webster, 1944: 369; 'Canadian accountants', 1881b: 4).

[15] Differs from 876 used elsewhere in this paper due to a small number of cases where NAPP and ourselves reached different conclusions about whether particular individuals should be classified as accountants.

[16] For Britain, Edwards and Walker (2007a: 69) also found that centres of high density were usually sea or inland ports.

Table 2
Population, accountants and bookkeepers in urban and rural areas in 1881

	Urban		*Rural*		*Total*	
	No	*%*	*No*	*%*	*No*	*%*
Population	1,109,507	26%	3,215,303	74%	4,324,810	100%
Accountants	659	75%	216	25%	875	100%
Bookkeepers	2,738	74%	960	26%	3,698	100%
Total functionaries	3,397		1,176		4,573	

Sources: NAPP; Statistics Canada, http://www40.statcan.ca/l01/cst01/demo62a.htm

members of the professional associations formed in Montreal and Toronto by 1881. We might imagine that these bodies were initially dominated by local recruits. This was certainly the case in Ontario at the time of the Institute of Accountants' inaugural meeting held 13 months after census day. Its membership list on 18 May 1882 included 69 accountants based in Toronto and, of the remaining 52, 47 worked elsewhere in Ontario. No early membership list has yet been uncovered for the Montreal Association but, given Collard's (1980: 22) description of it as 'more like a club than a corporate body with complete professional powers', we might speculate that its constituency was even more parochial than that of the Ontario Institute. The petitioners who successfully sought statutory recognition for the Montreal Association and the Ontario Institute,[17] so far as we have been able to identify them (FRFH Canada 1881; Little, 1989),[18] are listed in Table 3 together with the following demographic characteristics: census place, birthplace; ethnic origin; and religion. Collard's conception of the clubbish character of the Montreal Association is certainly supported by evidence concerning the known residence of its initial leadership, with seven living in the central Ste-Antoine Ward and the remaining three not far afield.

We can therefore conclude that initial professionalisation of the accounting occupation in Canada was effectively closed, on the basis of geography, to those working in Ontario and Quebec, and in the latter case possibly with a membership not extending far beyond the boundaries of Montreal.

7. Nativity and geographic location

Table 4 gives the birthplace of Canada's population and accounting functionaries. It reveals that immigrants were over-represented; the 14% reported by the enumerators as born outside Canada included 45% of Canada's accountants and 36% of its bookkeepers. The vast majority of accountants born outside Canada (350 out of 391) came from GB&I, with the US supplying most (29) of the remainder. Though less marked, a similar pattern existed in the case of bookkeepers. Between the two categories of accounting functionary, there is little variation in the proportions born in the constituent countries of GB&I. For example, 55% and 52% of accountants and bookkeepers, respectively, were born in England.

There are some interesting similarities and differences between our findings and those of Richardson (1989) for 'Canada's accounting elite'[19] during the early part of the 20th century. Richardson finds similar proportions of accountants as ourselves born in both GB&I (41% compared with 40%) and Quebec (19% vs. 17%).[20] However, whereas 36% of 'elite' accountants were born in Ontario, the 1881 census revealed just 23% of accountants in Canada native to that province. Most of the difference is due to the fact that only 2.5% of elite accountants were born in the maritime provinces compared with 14% from our own study. This suggests that it proved more difficult for accountants born in the maritime provinces to gain access to recognition at national level, and this might be partly attributable to later organisational representation in those parts of Canada.

Analysis of the accounting community by birthplace, when compared with the profile of Canada's

[17] Thirteen petitioners appeared in An Act to incorporate the Association of Accountants in Montreal, 1880, 43–44 Vict., Cap. 88 and 18 in An Act to incorporate the Institute of Accountants of Ontario, 1883, 46 Vict., Cap. 64.

[18] For the Montreal Association, we failed to trace with a sufficient degree of confidence among the census records: Edward Evans, Louis J Lajoie and Arthur H. Plimsoll. Similarly, for the Ontario Institute: Samuel Bickerton, G. W. Banks, William H. Cross, W. A. Douglas, R. H. Gray, Francis C. Ireland, John T. Moore and Charles Robertson.

[19] Richardson's 79 elite accountants are drawn from *Canadian Who's Who*, 1910 and 1936 editions, and *Who's Who in Canada*, 1910–30 editions (Richardson, 1989: 5 and 21).

[20] Provincial figures taken from NAPP database.

Table 3
Founders

Montreal Association		*Census place*	*Birthplace*	*Origin*	*Religion*
Beausoleil	Cleophas	Ste-James Ward, Montreal	Quebec	French	Catholic
Court	James	Ste-Antoine Ward, Montreal	Scotland	Scottish	Presbyterian
Craig	David J.	Outremont, Hochelaga, Quebec	Scotland	Scottish	Presbyterian
Darling	Thomas	Ste-Antoine Ward, Montreal	Scotland	Scottish	Presbyterian
Fair	John	Ste-Lawrence Ward, Montreal	Scotland	Scottish	Presbyterian
McDonald	John	Ste-Antoine Ward, Montreal	Scotland	Scottish	Presbyterian
Moffat	Alexander	Ste-Antoine Ward, Montreal	England	Scottish	Presbyterian
Perkins	Arthur M.	Ste-Antoine Ward, Montreal	Quebec	English	Presbyterian
Riddell	Alexander F.	Ste-Antoine Ward, Montreal	Scotland	Scottish	Presbyterian
Ross	Philip Simpson	Ste-Antoine Ward, Montreal	Scotland	Scottish	Presbyterian
Ontario Institute					
Clarkson	Edward R. C.		Ontario	English	
Coady	Richard T.	St George Ward, Toronto, York, Ontario	Ontario	Irish	Anglican
Eddis	Henry Wm.	York East, York East, Ontario	England	English	Anglican
Findlay	William F.	Pilkington, Wellington Centre, Ontario	Scotland	Scottish	Presbyterian
Harman	Samuel B.	St George Ward, Toronto, York, Ontario	England	English	Anglican
Johnson	J. W.	Belleville, Hastings West, Ontario	Ireland	Irish	Methodist
Mason	Jno. J.	Barrie, Simcoe North, Ontario	England	English	Anglican
Massey*	John	St Thomas Ward, Toronto, York, Ontario	England	English	Anglican
Millar	R. D.	Ward 5, London, Middlesex, Ontario	England	Scottish	Methodist
Ramsay	A. G.	Ward 2, Hamilton, Wentworth, Ontario	Scotland	Scottish	Anglican
Whitt	S.	St James Ward, Toronto, York, Ontario	England	English	Anglican

* Spelled Massay in census records
Source: FHRF Canada 1881; Little, 1981.

Table 4
Birthplace in 1881

	Population		*Accountants*		*Bookkeepers*	
	No.	*%*	*No.*	*%*	*No.*	*%*
England	173,184	4%	192	22%	575	16%
Ireland	190,152	4%	62	7%	201	5%
Scotland	117,645	3%	93	11%	331	9%
Wales	1,384	0%	3	0%	1	0%
Total GB&I	482,365	11%	350	40%	1,108	30%
US	78,264	2%	29	3%	148	4%
Other non-Canada	50,838	1%	12	1%	65	2%
Total non-Canada	611,467	14%	391	45%	1,321	36%
Canada	3,658,123	86%	483	55%	2,376	64%
Total known	4,269,590	100%	874	100%	3,697	100%
Unknown	8,584		2		1	
Total	4,278,174		876		3,698	

Sources: FHRF Canada 1881; http://www.nappdata.org/napp-action/codes.do?mnemonic=BPLCA

entire population, suggests informal closure in favour of immigrants from GB&I. This possibility can next be examined in greater depth due to the requirement for the census enumerators to elicit the perceived ethnic origin of the populace.

8. Ethnic origin and geographic location

> 'Canadians tend to identify themselves according to their ethnic origin, and it is not uncommon to hear Canadians who have never set foot in the British Isles describe themselves as "Scottish".' (Messamore, 2004: 1)

The exodus from Europe to Canada began in the second half of the 17th century when six thousand or so French immigrants formed the nucleus of New France. The situation began to change in the second half of the 18th century following the conquest of New France by the British and as the result of thousands of Loyalists emigrating north following the American Revolution in 1783. In addition to the loss of the American colonies, other dramatic episodes which encouraged migration to Canada include the Highland clearances in Scotland dating from the 1760s and the Irish potato famine of the 1840s. Migration from Britain to Canada, which saw the relatively affluent, as well as the impoverished, attracted by better prospects overseas (Harper, 2004: 16–18), was a pervasive feature of Western demographic patterns throughout the 19th century.

Reliable figures for migration from the British Isles to north America date only from 1815 when 680 are believed to have sailed for Canada and 1,209 to the US. The rate of exodus then spiralled, with numbers destined for the British dominion usually the larger until the mid-1830s when migration to the US escalated. 23,534 emigrated from GB&I to Canada in 1819, 66,339 in 1832 and 109,680 in 1847. By the 1870s, the average rate of annual out-migration to Canada had fallen to 23,817 compared with 147,065 to the US (Johnson, 1913: 344–345). The available records reveal that, among those emigrating to Canada between 1853 and 1880, 222,598 were English, 130,570 were Irish and 78,550 were Scottish (Johnson, 1913: 347).

The 1881 Canadian census required those supplying information to the enumerators to give the country of origin of each person resident in the household. The country of origin for accountants and bookkeepers and for the entire population is set out in Table 5.[21] Eighty-nine per cent of all accountants originated from GB&I compared with 60% of the entire population. A similar situation is revealed in the case of bookkeepers, 84% of whom considered their ethnic origin to be GB&I. Within this geographical category, we find higher proportions of accountants, compared with bookkeepers hailing from England (seven points up) and Scotland (three points up), and a lower proportion from Ireland (four points down). Bookkeepers originating elsewhere were mainly from France (90% of whom were resident in Quebec) and Germany (NAPP, 2004).

The null hypothesis that, in terms of ethnicity, accountants and bookkeepers are distributed in the same proportions as the general population can be conclusively rejected based on the results of the

[21] The indigenous population is understated for the reason given in footnote 10, with the best estimate showing them to account for 3% of the population.

Table 5
Ethnic origin in 1881

	Population		*Accountants*		*Bookkeepers**	
		%	*No.*	%	*No.*	%
GB&I						
English	878,073	21%	364	42%	1,300	35%
Irish	953,272	23%	161	18%	793	22%
Scottish	697,536	16%	250	29%	970	26%
Welsh	9,635	0%	5	1%	12	0%
Total GB&I	2,538,516	60%	780	89%	3,075	84%
French	1,288,705	31%	63	7%	402	11%
German	248,956	6%	15	2%	128	3%
Other non-Canadian	100,738	2%	16	2%	60	2%
Native Indian, Inuit and Negro	60,674	1%	0	0%	2	0%
Total known	4,237,589	100%	874	100%	3,667	100%
Unknown	40,585		2		31	
Total	4,278,174		876		3,698	

* English includes 7 British; French includes 12 French Canadians.
Sources: FHRF Canada 1881; http://www.nappdata.org/napp-action/codes.do?mnemonic=ORIGIN

chi squared test ($P < 0.0001$). This finding is highly significant, revealing that the distribution of accountants and bookkeepers was profoundly affected by ethnic origin.[22] For example, compared with the ethnic distribution of the population, there were, respectively, 183 (101%) more English accountants and 540 (63%) more English bookkeepers than would be expected in Canada in 1881. In contrast, for the ethnic French, there are 203 (76%) fewer accountants and 713 (64%) fewer bookkeepers than would have been observed if their numbers had been proportionate to population. Returning to Table 5, and focusing on the larger numbers, we can conclude that accounting functionaries from England and Scotland were more likely to be accountants and those from Ireland and France more likely to be bookkeepers.

This section reveals domination of the accounting community, both nationally and provincially, by accounting functionaries emanating from GB&I. Britain was the first country to industrialise and the first to professionalise the accounting craft. One might therefore see such domination as a consequence of the skills that immigrants brought with them. But by far the majority of the ethnic-GB&I accounting functionaries were born in Canada (Tables 4 and 5), and an unknown proportion of those born in the British Isles would have been below working age when arriving at their new home.

Overall, one can conclude that the composition of the nascent accounting community was beginning to reflect a degree of informal exclusionary closure based on ethnicity. Those most likely to penetrate the occupational boundary saw themselves as hailing from GB&I; those tending to be excluded were of French and German origin, with access to the accounting domain almost completely denied to the Native Indian, Inuit and Negro.

9. Religion

'Among the institutions which migrants transplanted or sought to re-establish, the most prominent were usually the church, the school, and the ethnic association.' (Harper, 2004: 26).

This section examines the religious affiliation of accounting functionaries and the relationship between religion and ethnic origin. The 1881 Canadian census revealed that 42% of the population were Roman Catholics, 40% were non-conformists'[23] and 13% were Anglicans (Table 6). The religious profile of Canadian accountants represents the inverse of that distribution. The dominant religious affiliation of accountants was Anglican (42%),[24] with the non-conformist groups together comprising 40% of the total. Just 15% of Canada's accountants described themselves as Roman Catholic.

[22] The same outcome occurs when the distribution of bookkeepers and accountants is examined on the basis of religious affiliation (Table 6).

[23] A non-conformist is any member of a Protestant congregation not affiliated with the Church of England.

[24] Richardson (1989: 10) reveals similar patterns for his cohort of elite accountants at the time of the 1931 census. For example, 42% of both elite accountants and accountants uncovered by the 1881 census were Anglicans whereas only 13% of the population in 1881 and 16% in 1931 reported a commitment to that church.

Table 6
Religious denomination in 1881

	Population		*Accountants*		*Bookkeepers*	
Anglican	575,157	13%	366	42%	1,043	28%
Baptist	291,832	7%	32	4%	196	5%
Methodist*	712,294	17%	115	13%	662	18%
Presbyterian	695,849	16%	201	23%	893	24%
Non-conformist	1,699,975	40%	348	40%	1,751	47%
Roman Catholic	1,790,773	42%	128	15%	743	20%
Lutheran	45,432	1%	2	0%	21	1%
Other	106,730	2%	25	3%	113	3%
Unknown	60,107	1%	7	1%	27	1%
	4,278,174	100%	876	100%	3,698	100%

* Includes 18 accountants and 73 bookkeepers who were Congregationalists.
Sources: FHRF Canada 1881; NAPP; http://www.prdh.umontreal.ca/1881/en/1881freqs.html

Table 7
Accountants' religious denomination and ethnic origin

		GB&I						
Ethnic origin	*English*	*Irish*	*Scottish*	*Welsh*	*French*	*German*	*Other/ Unknown*	*Total*
Religion								
Anglican								
Number	239	60	45	3	4	7	8	366
%	66%	37%	18%	60%	6%	47%	44%	42%
Baptist								
Number	17	5	8			1	1	32
%	5%	3%	3%			7%	6%	4%
Methodist								
Number	62	23	22	1		3	4	115
%	17%	14%	9%	20%		20%	22%	13%
Presbyterian								
Number	19	28	149	1		2	2	201
%	5%	17%	60%	20%		13%	11%	23%
Non-conformist								
Number	98	56	179	2		6	7	348
%	27%	35%	72%	40%		40%	39%	40%
Roman Catholic								
Number	7	42	17		59	2	1	128
%	2%	26%	7%		94%	13%	6%	15%
Lutheran								
Number	1						1	2
%	0%						6%	0%
Other/Unknown								
Number	19	3	9				1	32
%	5%	2%	4%				6%	4%
Total								
Number	364	161	250	5	63	15	18	876
%	100%	100%	100%	100%	100%	100%	100%	100%

Source: FHRF Canada 1881.

We have seen (Table 5) that the dominant accountant-ethnic group was English, and Table 7 reveals that most of them (66%) were Anglican. Other prominent ethnic/religious combinations show the Scots to be principally Presbyterian (60%) and the French to be almost exclusively (94%) Roman Catholic. These profiles are not unexpected. More surprising is the fact that more Irishmen attached themselves to the Anglican church than to any other denomination. In a study of the impact of demographic characteristics on the profile of the accounting occupational group, it is relevant to note that the Protestant domination of Canada's ethnic-Irish accounting cohort is consistent with Annisette and O'Regan's (2007) finding that, in the predominantly Catholic home country, 27 of the 31 founder members of the Institute of Chartered Accountants in Ireland (1886) were Protestant.

The religious affiliations of bookkeepers also diverged from those of the population as a whole, but to a lesser degree (Table 6). The highest proportion was again Anglican, but it stands at 28% of the cohort compared with 42% in the case of accountants. Presbyterians (24%), Roman Catholics (20%) and Methodists (18%) are, again, the next most numerous denominations, but the gap between each of these and adherents to the Anglican church is far less than in the case of accountants.

Among bookkeepers originating from England (Table 8), a much lower proportion (52% compared with 66% accountants) was Anglican, and a much higher proportion (42% compared with 27% accountants) was non-conformist. Scottish bookkeepers were even more likely to be Presbyterian compared to Anglican (68% vs. 10%) than in the case of accountants (60% vs. 18%), and French bookkeepers equally certain (95% vs. 94%) to be Roman Catholic. Amongst Irish bookkeepers, the Roman Catholic rather than Anglican church was the most common religious affiliation.

Evidence of informal exclusionary closure on the basis of religion is strong in the case of the accountant occupational group. There are more than three times (42% compared with 13%) as many Anglican accountants than would be the case if proportional to population, and 95% (347 out of 366, Table 7) of these were of GB&I ethnicity. Non-conformist representation corresponded to the profile of the population as a whole, but the barrier to the accountant occupational group proved extremely difficult for Roman Catholics to penetrate. The pattern is not entirely dissimilar in the case of bookkeepers, but it is certainly less marked, signalling less evidence of closed access to this lower status activity based on religious affiliation. Indeed, the distribution of bookkeepers by religious denomination compared with that of the entire population reveals a correlation coefficient of 0.65 compared with 0.41 in the case of accountants.

10. Women accountants and bookkeepers

FHRF Canada 1881 incorrectly reports seven accountants as female. It is almost certain that John Skaling and Hugh Bown Lewis were wrongly transcribed as female, while the sex of J. Bevan Giles cannot be inferred. It is difficult to establish the status of individuals in a Canadian household in 1881 given the absence of a census requirement to record their relationship to the head of household. Relying on names, ages, and information on marital status, it appears that Mary Lenmanth 'accountant' was living with her husband, four children and two other people. The fact that her husband's occupation was also stated as 'accountant' raises the possibility that Mary was not an accountant but an accountant's wife (Edwards and Walker, 2007b: 66). So far as can be judged from the information available, the remaining three women were *bona fide* accountants: Elizabeth Marling 'accountant' was 85 years of age, living with her school-master son and family in York East, Ontario; Julia Crompton 'accountant' lived with her clergyman father, mother and sister in Barrie, Ontario; Emma Campbell, who describes herself as 'comptable', origin 'Francais', was living with the Taylor family in Montreal.

Of the 3,698 Canadian bookkeepers, 78 (2.1%) were women.[25] Table 9 reveals a youthful profile with 22 (28%) under 20 years of age and a further 33 (42%) in their twenties. As in the case of female accountants, most (74%) had never married. As with males (84%), the ethnic origin of the vast majority of female bookkeepers (86%) was British or Irish, and they lived primarily in Ontario (53, 70%) or Quebec (13, 17%). Religious affiliation was also diverse, including 23 (29%) Methodists, 20 (25%) Presbyterians, 15 (19%) Roman Catholics and 13 (17%) Anglicans. However, women bookkeepers were more likely than men to be Methodist and less likely to be Anglican. The typical female bookkeeper in Canada in 1881 was therefore of British origin, under 30, non-conformist, unmarried and lived in Ontario or Quebec.[26]

It is clear from the foregoing that women in Canada remained almost entirely outside the community of accounting functionaries in 1881. This might be contrasted with the position in the 'moth-

[25] The 79 female bookkeepers listed in the NAPP database included Joseph Smith.

[26] The male bookkeeper was, similarly, often young and unmarried, but the likelihood was less in his case. Just under half (48.5%) had never married and the average age of the occupational group was 32.

Table 8
Bookkeepers' religious denomination and ethnic origin

Ethnic origin	*English*	*GB&I Irish*	*Scottish*	*Welsh*	*French*	*German*	*Other/ Unknown*	*Total*
Religion								
Anglican								
Number	671	217	97	2	6	30	20	1,043
%	52%	27%	10%	17%	1%	23%	22%	28%
Baptist								
Number	101	26	51	4	2	5	7	196
%	8%	3%	5%	33%	0%	4%	8%	5%
Methodist								
Number	338	138	105	6	6	42	27	662
%	26%	17%	11%	50%	1%	33%	29%	18%
Presbyterian								
Number	103	111	655		4	9	11	893
%	8%	14%	68%		1%	7%	12%	24%
Non-conformist								
Number	542	275	811	10	12	56	45	1,751
%	42%	35%	84%	83%	3%	44%	48%	47%
Roman Catholic								
Number	31	275	38		382	10	7	743
%	2%	35%	4%		95%	8%	8%	20%
Lutheran								
Number	1		1		1	18		21
%	0%		0%		0%	14%		1%
Other/Unknown								
Number	55	26	23		1	14	21	140
%	4%	3%	2%				23%	4%
Total								
Number	1,300	793	970	12	402	128	93	3,698
%	100%	100%	100%	100%	100%	89%	100%	100%

Source: NAPP.

er country' where, although accountants remained predominantly male (Kirkham and Loft, 1993), the occupation of bookkeeping was becoming gender mixed. Compared with Canada, where the 78 female bookkeepers accounted for just 2.1% of the occupational group, 2,616 female bookkeepers in Britain comprised 18% of that cohort (Walker, 2003: 611–612), and in certain counties the ratio was well over 50% (Edwards and Walker, 2007a: 73). At the start of the next section we present evidence of formal exclusionary closure practiced against women accountants when professional bodies were created in Montreal and Toronto. We then move on to reveal evidence of informal exclusionary closure in the demographic profile of the founders of the Montreal Association and the Ontario Institute.

11. Founders of the Montreal Association and the Ontario Institute

The presumption that professional accountants would be male was made explicit in the acts of incorporation of both the Montreal Association and the Ontario Institute. Section 4 (emphasis added) of the Montreal Association's enabling statute states that the 'amount to be paid by a member on *his* admission should not exceed twenty dollars', while section 10 (emphasis added) of the Ontario Institute's charter clarified rights on cessation of membership in the following male-exclusive manner:

> 'If any member during *his* lifetime ceases to be a member of the Institute, *he* shall not, nor shall *his* representatives, have any interest in or claim against, the funds or property of the Institute.'

A study of the demographic composition of the

Table 9
Age and marital status of women bookkeepers

Age	*Never Married*	*Married*	*Widowed*	*Total*
<20	22			22
20s	27	3	3	33
30s	4	6	3	13
40s	2	1		3
50s	3	2	1	6
60s			1	1
	58	12	8	78

Source: NAPP.

leaderships of Canada's first two accounting bodies reveals informal as well as formal closure practices. A striking feature of the initial leadership of the Montreal Association (Table 3) is its dominance by Scottish-Presbyterians. The first President, James Court, emigrated from Scotland to Canada in his late teens to work for his merchant uncle, William Blackwood. In 1831, he set up as a sole practitioner, 'making use of the knowledge of bookkeeping he had picked up at Blackwood's' (Collard, 1980: 20). A joint-founder of the firm Court and MacIntosh, 'He was a man of probity, preoccupied with moral and ethical issues. He was a Presbyterian, joint founder of a Young Men's Christian Association and founder of the Montreal Temperance Society' (Collard, 1980: 20). The second President, Philip Simpson Ross, also Presbyterian, emigrated as a young man from Lanarkshire in the early 1850s, and '[i]n 1874 he withdrew entirely from his "mercantile career" to concentrate on accountancy alone' (Collard, 1980: 21). The demographic profile of the 'actual founder' (Creighton, 1984: 1) of the Ontario Institute was quite different. William Robins was born (1850) in Cornwall, England, and his religion is reported in the census records as Church of England (Ancestry.ca, 1901). But 'without political significance', the manoeuvring required to achieve chartered status saw Robins absent from a Council 'replete with municipal politicians, exalted leaders of the Masons and prominent Anglican laymen' (Creighton, 1984: 12).

In common with that of their initial leaders, the ethnic/religious profiles of the petitioners for statutory recognition of the two professional accounting bodies also differed significantly (Table 3). In Ontario, the predominant profile was English/Anglican. The ethnic English focus is consistent with the fact that 46% (204 out of 441, FHRF Canada 1881) of all accountants in Ontario originated from that country. The founders' religious affiliation, however, contrasts with that of the Province overall 'where, by the late 19th century, Protestant pluralism had taken hold'. However, 'much of the elite were still Anglican',[27] and one would expect that an association of professional accountants aspired to such status. We surmise that the English/Anglican orientation explains why The Institute of Accountants and Adjusters of Canada based its initial constitution and bylaws on those of England's elite Institute of Accountants, established in London in 1870 (Creighton, 1984: 2; see also 'Canadian accountants', 1881a: 3, 1881b: 4).

The Scottish/Presbyterian orientation of the founders of the Montreal Association mirrors neither the ethnic origin of accountants in Quebec nor the dominant religious affiliation of its people, which was Roman Catholic. The 60 ethnic-Scot accountants in Quebec in 1881 comprised just 28% of the 214 accountants in that province. There were more ethnic-English accountants (62) in Quebec, and it was the Province where 57 of the 63 ethnic-French accountants lived and probably worked. However, the position was different in Montreal where the 40 Scots, within an accountant community of 102 in that city, comfortably outnumbered those of any other ethnic group (FHRF Canada 1881).

Founders of the first two professional bodies established in Canada therefore exhibit distinctive religious profiles which were also at variance with those of the provincial populations. Moreover, the Montreal Association's founders failed even to reflect the ethnic profile of accountants in Quebec, though it was consistent with that of those resident in the province's capital city.

12. Concluding remarks

The history of occupations and professions is marked by groups with interests in common joining together to deny social and economic opportu-

[27] *Wikipedia*. http://en.wikipedia.org/wiki/Religion_in_Canada#History

nities to others. The self-appointed elite will:

> 'embark on a process of social closure intended to both limit membership of the group itself and to appropriate the privileges of other competing groups. This will involve the adoption of various closure strategies intended to demarcate or reinforce boundaries, ensuring that membership is restricted and that certain 'ineligibles' or 'outsiders' are excluded. These strategies will include explicit and implicit criteria relating to, amongst others factors, race, class, gender, educational qualifications, credentials and the type of work performed' (O'Regan, 2008: 37).

As guest editor of the 'International Accounting History Special Issue' of *Accounting and Business Research*, Richardson (2002: 65) argued that the 'historical perspective provides practitioners and academics with a sense of the constancy of change and the impact of broader social forces on their craft'. This paper is designed to contribute to the 'types of studies' that, in Richardson's judgment (2002: 65), 'are needed to support a new global perspective by accountants on their profession'. It has done so by examining the spatial and demographic profile of the early accounting community in Canada for evidence of exclusionary closure based on findings from a census that contained questions designed to uncover the following key 'markers of identity' (Kertzer and Arel, 2002: 35): residence, occupation, nativity, ethnicity, religion and gender.

The answers provided to census enumerators revealed that the vast majority of Canadians continued to live (74%, Table 2) and work in rural areas in 1881. In direct contrast, 75% of accounting functionaries lived, and probably worked, in urban areas. As in Britain (Edwards and Walker, 2007a: 69), many of them resided in leading commercial ports. As noted above, just four cities adjacent to the St Lawrence Seaway (Quebec City, Montreal, Toronto and Hamilton) were home to 250 (29% of total) accountants and 1,444 (39%) bookkeepers. The merchant classes supported the primary industries that generated the products welcomed in Canada's export markets, but more extensive industrialisation was resisted on the grounds that it would reduce the need for imported commodities. By 1881, nevertheless, manufacturing and engineering works had begun to appear in certain parts of Canada. One would expect these to require accounting functionaries, but so too would, for example: the merchant enterprises that remained dominant throughout the Maritime Provinces; the Hudson's Bay Company that ran Manitoba until 1870; and parts of British Columbia energised though left economically depressed following the unfulfilled expectations fuelled by the gold rushes. Although 75% of all accounting functionaries were located in either Ontario or Quebec (655 out of 876, Table 1), greater densities of accountants or bookkeepers were found in the less-populated provinces. These and other differences between observed and expected features of the profile of accounting functionaries compared with that of the entire population offer, as indicated below, opportunities for future meaningful research.

The demographic characteristics examined in this paper have been dictated by the questions posed by the census enumerators. The range of these enquiries, and the consequential richness of the resulting database, has enabled us to construct a multi-faceted demographic profile for the membership of Canada's early accounting community and the leadership of its initial accounting associations.

The Canadian census had included a question on ethnic origin, from 1871, so as to register the changing proportions of the 'two founding peoples' – the French and English settlers – 'in relation to themselves and other groups' (Kertzer and Arel, 2002: 15). We discover, at the dawn of professionalisation in Canada, a narrowing of the demographics of the accounting community which contrasts dramatically with the population's overall profile. The French founding people, who comprised 31% of Canada's population in 1881, featured far less prominently among accounting functionaries (Table 5). In contrast, men and women originating from GB&I comprise 60% of Canada's population but 85% of its accounting functionaries. Ethnic-English are more prevalent within each occupational group, and dominate the accountants' profile to an even greater extent than that of bookkeepers. The ethnic-Scots are the next most numerous accounting functionaries, contributing about two-thirds of the ethnic-English numbers in each case. In contrast, the Irish and overseas accounting functionaries feature relatively more strongly in the listing for bookkeepers. Consistent with Davie's (2005: 556) study of a South Pacific state-owned enterprise, we find evidence of the accounting community in Canada, by 1881, applying 'a relatively covert form of racial differentiation and discrimination'.

The religious profile of accounting functionaries also differs markedly from that of the population as a whole. Whereas 42% of Canada's inhabitants, in 1881, were Roman Catholic, this was the religion of just 19% of all accounting functionaries (Table 6). In contrast, 31% of accounting functionaries were Anglican compared with 13% of the entire population. There are also clear signs that this further demographic variable had implications for the location of accounting functionaries within the accountant/bookkeeper divide. It is the Anglicans (normally English) and the Presbyterians (predominantly Scottish) that dominate the ac-

counting cohort. The Presbyterians feature even more strongly amongst bookkeepers, as do the Roman Catholics, but Anglicans less so. The key feature shining through census data relating to religious affiliation is that Anglican accounting functionaries were more likely to be working as accountants than as bookkeepers, whereas the opposite was the case for all other leading religious groups.

Drawing on Weberian closure theory, Murphy (1988: 8) asserts: 'Any convenient visible characteristic, such as race, language, social origin, religion, or lack of a particular school diploma, can be used to declare competitors to be outsiders.' In this paper we have shown that the profile of Canada's community of accounting functionaries does not conform to national or provincial norms concerning the following characteristics: residence, nativity, ethnicity, religion and gender. There are also clearly identifiable differences in the relative profiles of those who reported themselves as accountant to the census enumerators compared with those choosing the designation bookkeeper. These differences imply exclusionary closure being practised informally by certain sub-groups within the community of accounting functionaries in Canada in 1881. Further, evidence of both implicit and explicit exclusionary closure appears strong from our study of the composition of the founders of the professional organisations established in Ontario and Quebec at around this time.

The introduction to this paper draws attention to the importance of understanding the composition of an accounting community in the formative years of the professional bodies that subsequently seek to organise and control the composition and activities of its membership. Such knowledge helps us to understand the diverse character of the occupational group from which emerged a profession subsequently rendered more homogeneous through the pursuit of a professional project. Potentially, it also enables a better understanding of the problems facing a profession post-organisational formation. For example, Edwards and Walker's (2007a) study of the early community of accountants in Britain helped to explain the genesis of the perennial problems subsequently faced by those attempting to define occupational and professional boundaries and achieve closure. The history of Canada's professional bodies has, so far, been little studied by accounting historians. The complex character of Canada's early accounting community in 1881, as revealed in this paper, might be expected to inform subsequent work in that area. We conclude by identifying opportunities for future research that are today facilitated by the availability of census records in digital and electronic format (Dillon, 2000).

It is known that British professional accountants were active in the US in the last two decades of the 19th century, and influential in the development of that country's nascent accounting profession. Carey (1969: 27; see also, Lee 2002: 79) refers to 'The British Invasion' of accountants, and dates this assault as occurring in the late-1880s. Lee's (2007) paper shows that British accountants were active in the US on a scale disproportionate to the general migration across the Atlantic at an earlier date, i.e. 1880. The present study has revealed a relatively much stronger presence of accounting functionaries born in GB&I in Canada compared with in the US c.1880, comprising 40% (Table 4) vis-à-vis 12% (Lee, 2007: Table 9) of that occupational group. The role of British accountants, in general, in the development of the accounting profession in Canada is a subject worthy of attention from accounting historians. Within that arena, the current study signals the need to focus also on the demographic profile of the leaderships of Montreal Association and Ontario Institute. For example, an appropriate issue for further research is whether the 'homogeneity' of the ethnic-religious character of their leaderships served, as in Ireland (O'Regan, 2008: 40), 'to define and permeate the ethos and culture' of those professional associations.

A second major area for study would broaden research interest to the demographic composition of the entire communities of bookkeepers and accountants (both nationally and provincially) thereby augmenting McKeen and Richardson's (1998) investigation of gender as a criterion for exclusionary closure. One of a number of other fruitful areas for study would be to investigate ties between religion and wealth-formation as revealed by the spiritual orientation of accountants.

There is also scope for potentially meaningful micro-studies based on, for example, the finding that 17 of the 78 female bookkeepers resided in North York, and that nearly 80% (112 out of 143 (FHRF Canada 1881)) of ethnic-Germans lived and probably worked in Ontario.

Finally, this paper has revealed that work is required to improve our understanding of differentiation between accountants and bookkeepers, and there are at least two dimensions to be explored here. First, as Bouchard (1998: 76) points out: 'The occupational activity is often multidimensional and can lend itself to various titles, simultaneously or successively.' In the Canadian context, and elsewhere, there is a need to better understand the meanings attached to the terms accountant and bookkeeper. For example, why was it the case, at this time, that '[i]n some communities, such as Paris, Ontario, the top accounting officer was called the "bookkeeper"' whereas '[n]eighbouring London favoured the title "accountant"?' (Creighton, 1984: 18). The question of whether

variations in job descriptions reflected differences in the rate of etymological transition or genuine changes in the nature of tasks undertaken needs to be addressed. What is certain, based on findings from this paper, is that there were marked differences in the respective demographic profiles of the two groups. Second, there is scope for exploring relationships in the workplace between these two categories of accounting functionary. Here, notions of closure and 'conflicts of interest' (Krause, 1971: 84) intersect, with Collins (1990: 24) stating:

> 'There is a long-term dynamic consisting of endless conflict over market closure. Occupational structures, like capitalism and markets in general, do not stay put; they are constantly changing, as some occupations gain new resources in the struggle to gain closure over their markets, and other occupations lose some of the privileges they have gained.'

In addressing potential conflict of interest between the overlapping occupations of accounting and bookkeeper, Abbott's (1988) ideas about settlement by subordination and intellectual jurisdiction might well prove a fruitful analytical framework.

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Firm characteristics and audit committees complying with 'best practice' membership guidelines

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Abstract—This study investigates demand and supply characteristics associated with firms that voluntarily established audit committees meeting 'best practice' membership guidelines. We focus on a set of best practice criteria rather than on the separate elements of the best practice criteria as in past studies. We conduct our tests using a sample of New Zealand listed companies that, relative to firms in other capital markets, are smaller and have more concentrated ownership. This setting differs from prior research because we expect the costs of voluntarily achieving best practice to be reasonably high. The results show that demand factors are not significantly related to the presence of an audit committee that conforms with best practice membership guidelines. However, supply factors (i.e. those firms with larger and more independent boards) are more likely to form audit committees that meet best practice. These results suggest that compliance costs will be greater for firms with smaller and less independent boards of directors if they are required to comply with best practice requirements.

Keywords: audit committee; best practice guidelines; independence

1. Introduction

Responding to concerns over high profile corporate collapses and aggressive earnings management, authorities have introduced regulations to improve the functioning of audit committees (e.g. Sarbanes-Oxley Act 2002 (SOX), Financial Reporting Council, 2003 (FRC), Australian Stock Exchange Corporate Governance Council, 2003 (ASX)). Membership is seen as a key factor to improve audit committee effectiveness. For example, some jurisdictions require all audit committees members to be independent, others require a majority to be independent, and many require at least one member who is a financial expert (e.g. SOX, 2002; FRC, 2003; European Commission, 2002; Commonwealth of Australia, 2002).

The purpose of this paper is to examine the characteristics of firms that voluntarily adopt best practice guidelines for audit committee membership. We examine the adoption of audit committee membership in a context (i.e. New Zealand) where there are best practice guidelines, but no regulations for membership. Identifying characteristics of firms that voluntarily adopt best practice guidelines for audit committee membership will provide information for policy makers on the need for regulation and will identify the firms that will bear the greatest costs if best practice membership requirements are imposed.

Our study contributes to the literature on audit committees by focusing on a set of best practice membership guidelines that are multidimensional. Prior research typically focuses on specific aspects of audit committee membership. For example, Beasley and Salterio (2001: 550–551) examine board characteristics that are related to audit committee independence and financial expertise, but they examine independence and expertise in separate models. In contrast, we identify audit committees that meet all three New Zealand Securities Commission (NZSC, 2004: 20) guidelines (i.e. all non-executive directors, a majority of independent directors, and a member who is a financial expert). Thus, our approach assumes that audit committees will be more effective if they satisfy all three membership criteria.

We examine the effect of demand and supply variables on the formation of audit committees that meet best practice guidelines for membership. Similar to Beasley and Salterio (2001: 548), we focus on the board supply factors because the board is directly responsible for the composition of the audit committee and forms the pool of members from which it is drawn. For the demand factors, we focus on the impact of agency costs, because high agency costs may create a demand for high quality monitoring (e.g. a more effective

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audit committee).

Our findings indicate that as board size increases and the proportion of independent board members increases, the probability of having an audit committee that meets best practice guidelines for membership increases. On the other hand, we find little evidence that demand factors (such as leverage, growth opportunities) are related to the formation of audit committees that meet best practice guidelines. Assuming that the unconstrained firm will choose the best audit committee, given its board structure, our results suggest that firms with small boards and boards with more non-independent directors will bear the greatest costs if they are required to comply with best practice requirements. For example, we estimate that the cost of meeting the best practice audit committee membership guideline of at least one financial expert may increase the median director's fee by 80% while the recommendation for an audit committee with a majority of independent directors could increase the median director's fee by 19%.

The remainder of this study is structured as follows. We review and evaluate the prior literature on audit committee membership in Section 2. In Section 3, we develop the hypotheses, and in Section 4, we describe the research design. The results are presented in Section 5, and discussed in Section 6. In Section 7, the study is summarised and conclusions made.

2. Prior literature

The board of directors has primary responsibility for the financial statements which are prepared by the accounting function. The board of directors may delegate the responsibility for overview of the financial reporting process and the external and internal audit functions to an audit committee in which case there should be close communication between the audit committee and the internal and external auditors. Audit committees 'alleviate the agency problem by facilitating the timely release of unbiased accounting information by managers to shareholders, creditors and so on, thus reducing the information asymmetry between insiders and outsiders' (Klein, 1998: 279). Bradbury (1990: 22) also argues that audit committees reduce information asymmetry between executive and non-executive board members.

The responsibilities of an audit committee include the oversight of an organisation's financial reporting, risk management and internal and external audit functions; with the audit committee serving as the link between the board and these functions (e.g. Wolnizer, 1995: 47–49; Co-ordinating Group on Audit and Accounting Issues, 2003). Consistent with much of the prior research, we focus on the audit committee's role in monitoring the financial reporting process.

Recommendations for improving the effectiveness of audit committees have been made by a number of groups including directors (NACD, 1999), chief executive officers (Business Roundtable, 2002), professional accounting bodies (NZICA, 2003), stock exchanges (Joint Committee on Corporate Governance, 2001; NYSE and NASD, 1999), international accounting firms (PricewaterhouseCoopers, 2003) and government commissions (Ramsay, 2001). The recommendations often focus on improving the independence and expertise of audit committee members.

2.1. Audit committee independence

The board of directors is comprised of executive (inside) and independent (outside) directors. Fama and Jensen (1983: 314) explain that executive (inside) directors are internal managers who have specific information about the firm. The role of independent (outside) board members is to resolve disagreements between internal managers and to exercise independent judgment in situations where there are conflicts of interest between internal managers and shareholders such as appointing and compensating senior executives and reviewing financial statements. The OECD (2004: 25) supports firms appointing independent non-executive directors to deal with situations of conflicts of interest such as financial reporting, board nominations, and executive and board remuneration.

The NYSE and NASD (1999: 19) comment that non-executive directors that are independent of the firm will help to 'ensure the transparency and integrity of financial reporting' and maintain investor confidence in capital markets. The US Securities and Exchange Commission (SEC) (1999: 23) claims an independent audit committee will 'promote the quality and reliability of a company's financial statements'.

Audit committee independence is defined in various ways in listing requirements and best practice guides (see, for example, NYSE and NASD, 1999; SEC, 1999; ASX Corporate Governance Council, 2003). However, the general principle is that all or a majority of directors on the audit committee should be independent. Independent directors are non-executive directors (i.e. they are not part of management and they should not have any business interests or other relationships that could interfere with their ability to operate objectively).[1]

Researchers have examined the linkage between audit committee independence and audit committee functions of overseeing financial reporting quality, risk management and audit functions.

[1] 'Business interests' include substantial shareholdings, and 'other relationships' include previous employment, customer or supplier relationships or associations with management of the company.

These studies generally support the view of regulators that independent directors strengthen financial reporting by reducing the likelihood of fraudulent financial reporting and other financial reporting irregularities (e.g. DeFond and Jiambalvo, 1991: 651; Dechow et al., 1996: 21; Abbott and Parker 2000a: 60; Beasley et al., 2000a,b: 18, 450; Peasnell et al., 2001: 308; Abbott et al., 2004: 80). Audit committees that are more independent are also associated with lower levels of earnings management (e.g. Klein, 2002b: 389; Bedard et al., 2005: 29; Davidson et al., 2005: 256). Research evidence also suggests that independent audit committees can have a positive effect on external and internal audit functions by: appointing specialist external auditors (Abbott and Parker, 2000b: 59), reducing questionable external auditor switches (Abbott and Parker, 2002: 161; Carcello and Neal, 2003: 107), monitoring the independence of external auditors (Abbott et al., 2003: 226) and by interacting more with internal auditors (Raghunandan et al., 2001: 112; Scarbrough et al., 1998: 58).

Researchers have also investigated the characteristics of firms with independent audit committees. Audit committee independence is negatively associated with firm growth opportunities. The financial statements for firms with growth opportunities are considered to be less relevant to users so the demand for monitoring them is lower (Deli and Gillan, 2000: 430–431). Cotter and Silvester (2003: 224) find that audit committee independence is negatively related to firm leverage. However, leverage is not significant in other studies (Menon and Williams, 1994: 36, Deli and Gillan, 2000: 440, Klein, 2002a: 446, Beasley and Salterio, 2001: 559). Prior research also shows no significant association between audit committee independence and earnings performance, dividend payout, auditor type, industry regulation, or the number of segments within a firm or the firm's stock exchange listing (Cotter and Silvester, 2003; 226; Beasley and Salterio, 2001: 559; Deli and Gillan, 2000: 439).

In terms of board-related variables, audit committee independence is positively related to the percentage of independent directors on the board (e.g. Menon and Williams, 1994: 135–6; Beasley and Salterio, 2001: 556–562; Klein, 2002a: 446; Cotter and Silvester, 2003: 226) and to board size (Beasley and Salterio, 2001: 556–562, Klein, 2002a: 446). Blockholders on the board or on the audit committee are found to reduce the need for independent audit committees (e.g. Beasley and Salterio, 2001: 559; Klein, 2002a: 445). There is some evidence that audit committees are less independent if the CEO is the chair of the board (Beasley and Salterio, 2001: 559). Only one study has found a relationship between director ownership and audit committee independence (Deli and Gillan, 2000: 439). A CEO on the compensation committee, which is a surrogate for the CEO's influence over the board, has no impact on audit committee independence (Klein, 2002a: 445).

2.2. *Audit committee director financial expertise*

An audit committee's monitoring role includes reviewing financial statements and assessing the degree of aggressiveness and conservatism of the accounting policies and accounting estimates. In the US, SOX (2002: section 204) requires auditors of issuers to report to the audit committee on 'all critical accounting policies and practices to be used, all alternative treatments of financial information within generally accepted accounting principles that have been discussed with management'.

Given the complexities of business and the responsibility of audit committees to monitor the integrity of the financial statements, regulatory bodies have raised concerns about the knowledge and experience of audit committee members. In 1994, the Advisory Panel on Auditor Independence (1994: 15) supported the findings of the Institute of Internal Auditors that 'the effectiveness of audit committees is affected first and foremost by the expertise of members of audit committees in the areas of accounting and financial reporting, internal controls and auditing'. Arthur Levitt (1998: 7), former SEC chairman, recognised the need for audit committee members to have appropriate backgrounds, stating that 'qualified, committed, independent and tough-minded audit committees represent the most reliable guardians for the public interest'. The BRC (NYSE and NASD 1999: 12) recommended that independent audit committee directors should be financially literate and have at least one director with accounting or related financial management expertise. These recommendations are incorporated into legislation in the US (SOX, section 407) and by elsewhere (e.g. FRC, ASX).

The importance of financial expertise in monitoring financial reporting is supported in research by Kalbers and Fogarty (1993: 37). Firms with audit committee members who have financial expertise are less likely to be subject to censure for poor financial reporting (Agrawal and Chadha, 2004: 19; Farber, 2005: 551; McMullen and Raghunandan, 1996: 80), more likely to have higher quality earnings (Qin, 2007: 18) and more likely to reduce earnings management for firms with weaker corporate governance mechanisms (Carcello et al., 2006: 23). In addition, audit committees with financial experts are more likely to promote more conservative financial reporting when the overall board corporate governance is strong (Krishnan and Visvanathan, 2008: 24), and financial experts, with audit knowledge, are more

likely to support the external auditor in disputes with management relating to 'substance over form' issues (DeZoort and Salterio, 2001: 41).

Nonetheless, there is limited research on the characteristics of firms that have audit committees with financial expertise and those that do not. Beasley and Salterio (2001: 562) show that independent directors with financial reporting and audit committee knowledge are more likely to be appointed by firms with larger boards, and by those with a higher proportion of independent directors, but are less likely to be appointed by firms where the board is chaired by the CEO. DeFond et al. (2004: 176) find that the US capital market reacts favourably when individuals with accounting expertise are appointed to audit committees.[2] However, the reaction is only positive if the experts are independent and the firm has strong corporate governance in place before the new directors are appointed. This suggests that accounting expertise on audit committees may only add value if other firm characteristics facilitate its use.

2.3. Best practice guidelines in New Zealand

Following overseas jurisdictions, in late 2003 the New Zealand stock exchange (NZX) introduced recommendations for audit committee membership. In 2004, the NZSC developed a set of corporate governance principles (NZSC, 2004: 11). The NZSC's principles (which are more stringent than the NZX's) recommend that audit committees comprise all non-executive directors, have a majority of independent directors, and have a member who is an accounting expert.[3] We refer to audit committees that satisfy all three of these recommendations as 'best practice' audit committees.

3. Hypotheses

In developing hypotheses for the voluntary adoption of best practice audit committees, we consider both demand and supply factors. It is hypothesised that firms with potentially high agency costs are more likely to voluntarily form best practice audit committees for monitoring purposes. That is, if audit committees are formed to enhance the credibility of financial statements, they will be more useful when financial statements are used for monitoring purposes. Supply factors include board size and the proportion of independent directors on the board, which reflects the ability of the firm to appoint directors who possess the required audit committee member characteristics. Thus, our main objective is to determine whether the demand or supply factors dominate in determining the composition of the audit committee – or whether the demand and supply factors have similar effects. If demand factors dominate, this would suggest that the market will force firms to adopt best practice membership guidelines. However, if supply factors dominate, firms are unlikely to adopt such guidelines as doing so would require that the firm alters other aspects of its governance structure (e.g. enlarge its board, increase the proportion of independent directors on the board).

3.1. Demand factors

Leverage

Agency costs arise with the use of debt as there are potential conflicts between shareholders and debtholders (Jensen and Meckling, 1976: 333–343). To mitigate these conflicts, covenants are typically written into debt contracts requiring firms to supply audited financial statements and a certificate confirming compliance with the covenants (e.g. Smith and Warner, 1979: 125). As violating debt covenants can be costly for a firm, managers have incentives to avoid breaking them (e.g. Watts and Zimmerman, 1986: 210–217). Empirical research suggests that managers make accounting choices to affect the calculations used to determine compliance with debt covenants (e.g. Healey and Whalen, 1999: 376). Such accounting choices include making income-increasing changes around the time of default (Sweeney, 1994: 293) and changing accounting policies (Beatty and Weber, 2002: 134).

Directors have a responsibility to ensure the integrity of the financial statements provided to debtholders and to monitor compliance with debt covenant provisions. The demand for this type of monitoring should increase as the level of debt and the risk of managers manipulating accounting choices to ensure compliance with debt covenants increases. When debt levels are high, we expect that boards will voluntarily establish independent audit committees with financial expertise to reassure debtholders that the audit committee is effectively monitoring the reporting process. Based on the argument that effective monitoring by audit committees can reduce agency costs for firms with high debt levels, it is hypothesised that:

H1 Firms with higher levels of debt are more likely to voluntarily appoint audit committees that meet best practice membership guidelines.

Executive director shareholding

Another need to monitor management arises from the separation of ownership and management (Jensen and Meckling, 1976: 309). As executive

[2] An accounting expert is a director with experience as a public accountant, auditor, chief financial officer, controller, principal or chief accounting officer.

[3] The NZX's Best Practice Code requires issuers to establish audit committees consisting solely of non-executive directors. It does not refer to independent directors or financial expertise.

director share ownership increases, managers' and shareholders' incentives are more closely aligned, thus reducing agency costs and the level of monitoring required (e.g. Rosenstein and Wyatt, 1997: 240). Empirical research shows that at lower levels of ownership, managers may become involved in activities that do not add value to shareholders such as time-wasting and diverting resources to unprofitable projects (e.g. Morck et al., 1988; Hermalin and Weisbach, 1991: 106; Holderness et al., 1999: 459).[4] It is hypothesised that:

H2 Firms where executive directors have a higher share ownership are less likely to voluntarily appoint audit committees that meet best practice membership guidelines.

Blockholders

Blockholders, who own substantial amounts of a firm's shares (defined in this study at 5% or more of the issued shares), have sufficient financial incentives to monitor the performance of management. They also have voting power that, if required, can be used to take action (e.g. Jensen, 1993: 867, Shleifer and Vishny, 1997: 754–755).

Prior research indicates that blockholders have a positive influence on the formation of an audit committee (Bradbury, 1990: 23). Blockholders on audit committees are likely to mitigate earnings management (Bedard et al., 2005: 25). Furthermore, firms subject to SEC enforcement actions are less likely to have blockholders (Dechow et al., 1996: 21) while firms that overstate earnings have more diffuse ownership (DeFond and Jiambalvo, 1991: 653). Beasley and Salterio (2001: 559) find blockholders on the board are negatively associated with audit committee independence. Similarly, Klein (2002a: 445) finds audit committee independence declines when blockholders are represented on the audit committee.

On the basis that substantial blockholders are considered substitute monitoring mechanisms for audit committee independence and financial expertise, it is hypothesised that:

H3 Firms with blockholders on the board of directors are less likely to voluntarily appoint audit committees that meet best practice membership guidelines.

Big Five auditors

Use of a Big Five auditor is likely to reflect higher agency costs and a greater demand for high quality financial statements (e.g. Watts and Zimmerman, 1986). Eichenseher and Shields (1985: 25–27) provide evidence that newly hired small audit firms are reluctant to encourage audit committee formation because audit committees have a preference for large audit firms. It is likely that large audit firms will also promote best audit committee practice. Hence:

H4 Firms with large audit firms are more likely to voluntarily appoint audit committees that meet best practice membership guidelines.

Market to book

Deli and Gillan (2000: 440) and Klein (2002a: 445) find that growth opportunities are significantly and negatively related to audit committee independence. A potential reason for this is that financial statements are a more important monitoring mechanism for firms with assets-in-place relative to growth opportunities. Given that a major function of an audit committee is to increase the credibility of financial statements, it follows that best practice audit committees will be more (less) useful for firms with higher assets-in-place (lower growth opportunities).

H5 Firms with a higher proportion of growth opportunities are less likely to voluntarily appoint audit committees that meet best practice membership guidelines.

3.2. Supply factors

Board size

Small boards are easy to manage and free riders are more easily identified compared to large boards. Jensen (1993: 865) advocates appointing small boards because boards with more than seven or eight members are not effective and are easier for the CEO to control. For example, as board size increases, the likelihood of financial statement fraud increases (Beasley, 1996: 462).

Large boards may be a sign of more complex governance issues that require delegation to specialist committees such as a high quality audit committee to improve the board's responsiveness and improve oversight. Similarly, independent directors are more likely to demand high quality monitoring of financial reporting to enhance their own reputations (Fama, 1980: 294).

Establishing separate committees enables a board to focus on specific areas of responsibility where the skills and knowledge of directors can be maximised and the workload shared (e.g. NZSC, 2004: 20). As boards increase in size, the ability to appoint independent directors with expertise in various areas, including financial expertise, increases. The empirical evidence shows that audit committee independence increases with board size (e.g. Klein, 2002a: 445) and that larger boards are more likely to establish audit committees which exceed minimum legal requirements for independence and financial expertise (Beasley and Salterio, 2001: 559–563).

[4] However, Morck et al.'s (1988) results suggest that excessive levels of managerial ownership could also lead to entrenchment and suboptimal behaviour.

Based on these arguments, we hypothesise that:

H6 Firms with larger boards are more likely to voluntarily appoint audit committees that meet best practice membership guidelines.

Independent board directors

Information asymmetries exist between executive and independent directors because executive directors usually have more information about a firm than independent directors. Independent directors have incentives to seek this information and enhance their reputations as monitors (Fama, 1980: 294).

Although independent directors may have less information about a firm, they are also less influenced by the CEO, and are more likely to evaluate financial reports more objectively (e.g. NYSE and NASD 1999: 22) and to hold directors more accountable for financial results (e.g. Committee on Corporate Governance, 1998: 7). Empirical research suggests that having independent directors on the audit committee improves the quality of financial reporting. Firms investigated for fraudulent reporting or financial irregularities often have boards dominated by executive directors (Dechow et al., 1996: 21). Firms with a high percentage of independent board directors are less likely to have financial reporting problems (e.g. Beasley, 1996: 455; Peasnell et al., 2001: 308; Song and Windram, 2004: 203).

As the proportion of independent directors on the board increases, it is more likely for an audit committee to include more independent directors (e.g. Menon and Williams, 1994: 137) and independent directors with financial reporting and audit committee knowledge (Beasley and Salterio, 2001: 562).

On the evidence of prior research that independent directors improve the quality of financial reporting monitoring, we hypothesise that:

H7 Firms with a higher proportion of independent directors on their boards are more likely to voluntarily appoint audit committees that meet best practice membership guidelines.

4. Research design

4.1. Model and variables

We use a logit model to test the relation between and demand and supply factors and the likelihood that audit committees will meet specified membership criteria. The logit model is specified in equation (1):

$$\begin{aligned} ACBP = {} & \beta_0 + \beta_1 LEV + \beta_2 EXDIRSH + \\ & \beta_3 BLOCK + \beta_4 BIG5 + \beta_5 MTB + \\ & \beta_6 BDSIZE + \beta_7 BDIND \end{aligned} \quad (1)$$

where ACBP is an indicator variable that is equal to 1 if a firm has a best practice audit committee comprised of all non-executive directors, consisting of a majority of independent directors, and including an accounting expert, and 0 otherwise.[5] This definition is consistent with the NZSC (2004) principles and guidelines and the ASX requirements but is more stringent than the NZX (2003) best practice code and less rigorous than the SOX and FRC requirements.[6]

For classification purposes, a non-executive director is a director who is not a member of senior management at the firm. An independent director is defined as one who is not employed or closely affiliated with the company. It excludes a non-executive director who is a past employee of the company and/or has significant or business relationships with the firm. A director with a substantial equity holding is not considered an independent director even if not active in the management of the company. The definition of an independent director is consistent with that recommended by the NYSE and NASD (1999: 10–11). We read annual report disclosures, in particular the related party disclosures in the notes to the financial statements, to determine whether each director is an independent director.

We also determine whether each director has financial expertise. We classify directors who are qualified as a chartered accountant (CA) as having financial expertise.[7] We use a directory maintained by the New Zealand Institute of Chartered Accountants to identify CA-qualified directors.

We also report the results of equation (1) using two alternative dependent variables (i.e. measures of audit committee composition). Audit committee

[5] Firm and time subscripts are omitted from equation 1, for ease of exposition.

[6] The NZSC (2004) and ASX Corporate Governance Council (2003) recommend audit committees comprise all non-executive directors, the majority of whom are independent, with at least one director who is a chartered accountant or has another recognised form of financial expertise, and a chairperson who is independent and not the chairperson of the board. The NZX (2003) recommends that an audit committee consist solely of non-executive directors. No reference is made to financial expertise. SOX (2002) section 301 requires public company audit committees to be independent of management, and in section 407 SEC registrants must disclose whether or not the audit committee has at least one financial expert. The FRC Combined Code (2003) requires audit committees of at least three members (two members for smaller companies) who are independent non-executive directors with at least one member having recent and relevant financial experience.

[7] This definition is largely consistent with the NZSC (2004) view but is narrower than that legislated in the SOX Act. The SOX Act definition includes presidents and chief executive officers as financial experts because it was considered that a narrow definition would limit the pool of qualified directors able to be appointed as experts (DeFond et al., 2004). The narrower definition of an accounting expert is adopted in this study because of a lack of consistency in the disclosure of directors' backgrounds in company annual reports.

Table 1
Sample selection

	# of firms
Initial sample	109
Less: Unit trust and finance companies	(2)
Less: Firms delisted	(8)
Less: Firms with audit committees but no details on composition	(9)
Less: Firms that did not disclose if they had an audit committee or not	(7)
Less: Firms with a lack of data	(3)
Less: Firms with an overseas stock exchange listing	(24)
Final sample	56

independence (ACIND) is coded 1 if the audit committee is comprised of a majority of independent directors and 0 if it is not. Audit committee accounting expertise (ACEXP) is equal to 1 if at least one member is a member of a professional accounting body and 0 otherwise. This also allows us to investigate whether the same agency cost factors and board characteristics drive firms' decisions to add independent members and to add members with expertise.

For the independent variables, debt (LEV) is the ratio of borrowings to firm size.[8] The cumulative percentage of shares held by executive directors as a percentage of the total shares issued is the measure of executive director share ownership (EXDIRSH). BLOCK is the percentage of shares issued to shareholders who each have at least 5% of the issued shares of a company. BIG5 is a dummy variable equal to 1 if the firm employs a large auditor and 0 otherwise. Growth opportunities are measured using a market to book ratio (MTB). Board size (BDSIZE) is the number of individuals serving on the board of directors and BDIND is the percentage of independent directors on the board of directors. We do not explicitly control for firm size since board size and firm size are highly correlated (r = 0.61).

4.2. Sample and data

We select New Zealand companies listed on the NZX main trading board as reported in the 2001 Investment Guide (Datex Services Limited, 2001). We choose 2001 because we want to focus on the firm's voluntary decision to adopt a best practice membership audit committee. Thus, we need a period that is uncontaminated by external forces that might have led firms to adopt a best practice membership guidelines. For example, the overseas' responses to the collapse of firms like Enron and WorldCom (e.g. changes in stock exchange listing rules, enactment of the SOX Act) that began to appear from 2002 could have created pressure for firms to improve their corporate governance, even though formal responses did not appear in New Zealand until 2003. Using 2001 data gives us a cleaner test of firm's incentives to choose a high quality audit committee that possess best practice elements.

Our initial sample is 109 firms. We exclude a unit trust and a large insurance and banking company because the governance and financial structures of these entities differs from that of most other company organisations.[9] Eight firms are excluded because of delisting. We omit 19 firms that did not provide sufficient data such as audit committee details. Finally, we eliminate 24 firms that are listed on overseas stock exchanges where audit committee composition might be regulated. This results in a final sample of 56 firms. Table 1 summarises the sample selection.

We obtain financial data from Datex. The audit committee data was hand-collected from annual reports. Where information on audit committee members was incomplete, a letter was sent to the listed company requesting the information.[10] We use company press releases and websites to obtain the qualifications of directors if they were not disclosed in the annual reports. We use the website of the New Zealand Institute of Chartered Accountants to determine if directors on the audit committees were members of the national professional accounting body. However, we acknowledge that this process did not identify directors who have an accounting certification from an overseas professional accounting body.

[8] Firm size is measured as the market value of equity plus the carrying amount of total liabilities.

[9] Unit trusts are investment vehicles whereby funds are invested by investors and managed by professional portfolio managers in accordance with agreed investment objectives.

[10] 89 companies were sent a letter requesting additional information. A total of 54 responses were received representing a response rate of 60.67%.

Table 2
Description of dependent variables

Panel A: Means	*Label*	*Mean*	*N*
Audit committee with accounting expert	ACEXP	0.679	38
Independent audit committee	ACIND	0.518	29
Best practice audit committee	ACBP	0.339	19

Panel B: Relation between ACEXP and ACIND

ACIND		0	1	Total
ACEXP	0	11	7	18
	1	16	22	38
	Total	27	29	56

ACBP is 1 if a company has an audit committee with all non-executive directors, with a majority (greater than 50%) of independent directors and a director with a professional accounting qualification, 0 otherwise. ACIND is 1 if a company has an audit committee, with greater than 50% independent directors, 0 otherwise. ACEXP is 1 if a company has an audit committee with a member holding a professional accounting qualification, 0 otherwise. The sample size is 56.

5. Results

5.1. Descriptive statistics and univariate analysis

Table 2 Panels A and B reports the descriptive statistics of the dependent variables used in this study. Of the 56 listed companies, 67.9% (38 firms) have an accounting expert on the committee (ACEXP) and 51.8% (29 firms) of the firms have a majority of independent directors (ACIND). There are 22 firms (39.3%) that meet both these requirements. There are 19 firms (33.9%) that meet audit committee best practice membership guidelines audit committees (ACBP). The percentage of firms with independent audit committees (ACIND) is lower than the US (86.7% in Klein, 2002a: 442), but similar to Australia (64.2% in Cotter and Silvester, 2003: 219).

Table 3 reports the descriptive statistics for the explanatory variables. The mean for LEV is 0.312. On average, executive directors (EXDIRSH) own 3.5% of the issued shares and blockholding shareholders (BLOCK) own 47.3% of issued shares. Eighty-seven percent of firms employ a Big Five auditor. The average market to book ratio is 1.6. Boards have a mean size of 5.9 directors (BSIZE), and 52% of the boards have a majority of independent directors (BIND).

Table 4 reports the results of Mann-Whitney univariate tests of the explanatory variables. We employ nonparametric tests because of the small sample size and because they require no assumptions about the normality of the data. We report a Mann Whitney U tests for the continuous variables and a chi-square for the Big Five indicator variable.

Leverage (LEV) is weakly significant (i.e. $p > 0.05$) and negatively related to audit committee quality across all three measures. This suggests that leverage and audit committees may be substitute monitoring mechanisms. Specifically, debtholders have incentives to monitor the firm directly, and debt can reduce the firm's free cash flows (Jensen, 1986: 324) which imposes discipline on the managers. Executive directors' shareholdings (EXDIRSH) is only weakly significant (at 0.10 level) for independent audit committees (ACIND). While this positive relation is contrary to expectations, EXDIRSH is not significant in the ACBP or ACIND models and is not significant in the multivariate tests. Thus, in general EXDIRSH and audit committees are unrelated. There is a weak negative relation between blockholders (BLOCK) and an audit committee with accounting expertise (ACEXP) which provides support for the view that blockholders and audit committees are substitutes. Neither BIG5 nor MTB are related to audit committee quality. One reason might be that BIG5 and MTB are relatively noisy proxies for audit quality and growth opportunities. There is a strong positive relation between board size (BDSIZE) and independent and best practice membership audit committees, but not expertise. As expected, board independence (BDIND) is positively and significantly related to audit membership across all three measures.

Table 5 reports the bivariate correlations between the independent variables. The significant correlation between MTB and leverage is as expected (Myers, 1977). There are also significant correlations between EXDIRSH and BLOCK, EXDIRSH and BDIND, and LEV and BIG5. None of these correlations suggest that multicollinearity will be a major problem; nevertheless, we undertake additional analysis to address this issue.

Table 3
Descriptive statistics of independent variables

	Label	*Mean*	*Std dev*	*Median*	*Minimum*	*Maximum*
Leverage	LEV	0.312	0.232	0.438	0.000	3.114
Executive director shareholding	EXDIRSH	0.035	0.003	0.073	0.000	0.326
Blockholding	BLOCK	0.473	0.503	0.265	0.000	0.898
Big Five	BIG5	0.875	1.000	0.334	0.000	1.000
Market to book	MTB	1.602	1.055	1.376	0.459	7.865
Board size	BDSIZE	5.946	6.000	1.995	3.000	11.000
Board independence	BDIND	0.520	0.470	0.239	0.000	1.000

LEV is the ratio of borrowings to firm size (the market value of equity plus carrying amount of total liabilities). EXDIRSH is the total number of shares held by executive directors as a percentage of the total shares issued. BLOCK is measured as the percentage of shares owned by shareholders, each with more than a 5% of the firm's issued shares and represented on the board of directors. BIG5 is 1 if a firm has a Big Five auditor, 0 otherwise. MTB is the market-to-book ratio. BDSIZE is the number of individuals serving on the board of directors, and BDIND the proportion of independent directors on the board of directors. The sample size is 56.

Table 4
Univariate tests of explanatory variables

			ACBP		*ACEXP*		*ACIND*	
	Predicted sign	*Test*	*Test statistic*	*p-value*	*Test statistic*	*p-value*	*Test statistic*	*p-value*
LEV	+	MWU	–1.705	(0.044)	–1.930	(0.027)	–1.550	(0.061)
EXDIRSH	–	MWU	1.249	(0.106)	0.070	(0.472)	1.348	(0.089)
BLOCK	–	MWU	–0.554	(0.290)	–1.571	(0.058)	0.591	(0.277)
BIG5	+	CS	0.421	(0.516)	0.421	(0.516)	0.255	(0.614)
MTB	–	MWU	0.078	(0.469)	0.333	(0.369)	0.746	(0.228)
BDSIZE	+	MWU	2.507	(0.006)	0.924	(0.178)	3.297	(0.000)
BDIND	+	MWU	3.845	(0.000)	2.006	(0.022)	3.610	(0.000)

The variables are defined in Tables 2 and 3. A nonparametric Mann Whitney U test (MWU) is employed for continuous variables and a chi-square test (CS) is reported for the binary BIG5 variable. Except for the CS test, p-values are one-tailed. A negative test statistic indicates that where the dependent variable (ACBP, ACEXP, or ACIND) is 0, this group of observations has a higher mean rank than where the dependent variable is 1.

5.2. Multivariate analysis

Table 6 presents the results of a logit regression for each measure of best practice for audit committee membership: ACBP, ACEXP and ACIND. Our main focus is on ACBP. In this regression, the model Nagelkerke R^2 is 59.8% which compares favourably with similar studies such as Klein (2002a: 446) who reports an adjusted R^2 of 24%. The only demand variable that is significant is market to book (MTB), which is weakly and negatively significant (at 0.10). Both supply variables, board size and board independence are positively and significantly related to ACBP at 0.05 and 0.01 levels, respectively. This indicates that, consistent with H6 and H7, firms with large boards and firms with independent boards are more likely to create audit committees that conform to best practice standards.

The logit regressions for ACEXP and ACIND are also significant. The explanatory power for ACIND of 52.9% is similar to the ACBP model. However, the explanatory power of ACEXP is

Table 5
Spearman correlations matrix

	LEV	EXDIRSH	BLOCK	BIG 5	MTB	BDSIZE	BDIND
LEV		–0.016	–0.118	–0.165	–0.285*	–0.156	–0.076
EXDIRSH	–0.027		–0.361**	–0.074	0.228	0.233	0.272*
BLOCK	–0.064	–0.135		–0.048	–0.013	0.148	–0.231
BIG5	–0.349**	–0.018	–0.072		0.062	0.183	–0.094
MTB	0.195	–0.025	–0.062	0.055		–0.014	0.087
BDSIZE	–0.149	0.238	0.165	0.181	–0.102		0.224
BDIND	0.113	0.105	–0.226	–0.117	0.008	0.156	

The variables are described in Table 3. Spearman rank correlations are reported above the diagonal and Pearson correlations are reported below the diagonal. The sample size is 56. *, ** indicate significance at the 0.05 and 0.01 levels, respectively. p-values are two-tailed.

Table 6
Logit regression results

Model:			*ACBP*	*ACEXP*	*ACIND*
	Predicted sign		*Coefficient (p-value)*	*Coefficient (p-value)*	*Coefficient (p-value)*
Constant			–7.362 (0.016)	0.947 (0.298)	–6.702 (0.004)
LEV	H1	+	–1.902 (0.199)	–3.384 (0.029)	–1.816 (0.096)
EXDIRSH	H2	–	4.284 (0.208)	–5.620 (0.123)	0.347 (0.472)
BLOCK	H3	–	0.541 (0.371)	–2.815 (0.041)	2.498 (0.077)
BIG5	H4	+	0.649 (0.321)	–0.230 (0.415)	0.138 (0.455)
MTB	H5	–	–1.165 (0.085)	0.100 (0.351)	–0.046 (0.452)
BDSIZE	H6	+	0.446 (0.033)	0.174 (0.180)	0.353 (0.035)
BDIND	H7	+	8.800 (0.001)	3.098 (0.038)	7.918 (0.001)
–2 Log likelihood			40.1	54.0	49.3
Nagelkerke R^2			0.598	0.353	0.529
% Predicted correct			82.1	82.1	76.8

The variables are described in Table 3. The sample size is 56. p-values are one-tailed.

lower at 35.3% which suggests that the appointment of accounting experts to audit committees is related to other demand and supply factors yet to be explored.

When ACIND or ACEXP are used as the dependent variable, the supply variables (BDSIZE and BDIND) are also supported. Independent boards (H7) are more likely to choose audit committees that have accounting experts and that are independent. Board size (H6) is supported for ACIND, but not for ACEXP.

In contrast to the results for ACBP, LEV is significantly related to ACEXP and ACIND, but in both cases, the positive coefficient is opposite to

that hypothesised. This suggests that high leverage firms are less likely to have a best practice audit committee. One reason for this result might be that leverage acts as a substitute for an audit committee as a monitoring mechanism. First, debt provides discipline for managers by reducing free cash flows (Jensen, 1986: 324). Second, lenders can directly monitor the firm's financial performance which obviates the need for an independent audit committee or an audit committee that has financial expertise.

While BLOCK is not significant in the ACBP model, it is significant in both ACEXP and ACIND models. However, in the ACEXP and ACIND models the signs are both significant and different, thereby cancelling the effect in the ACBP model. This suggests the role of blockholders in monitoring arrangements and governance is more complex than that hypothesised (H3). A rationale for this result is that blockholding directors will seek to be on audit committees to have direct access to the auditors and reduce the information asymmetry between the blockholding directors and the internal directors (Bradbury, 1990: 22). The results are consistent with blockholding directors being substitutes for expert, but not independent, directors on audit committees.

Growth opportunities (MTB) is significant in the ACBP model, but not in either the ACIND or ACEXP models. This may reflect the highly discretionary nature of growth opportunities, which requires a need for audit committee directors with both greater independence and greater expertise. Alternatively, MTB might be a noisy proxy for growth opportunities, which can reduce the models' explanatory power.

In summary, the results indicate that the probability that a best practice audit committee is established increases as board size increases and as board independence increases. Thus, it seems that the supply factors dominate the demand-related factors in determining the likelihood of a firm having an audit committee that meets best practice guidelines.

5.3. Additional analysis

This section summarises additional work undertaken to assess the robustness of the results to additional variables and to potential concerns about multicollinearity and endogeneity bias.

Alternative sample and independent variables

In the reported results, we eliminate firms that are listed overseas because they are more likely to be affected by overseas local listing rules. However, this raises a concern over the small sample size on which the logit analysis in Table 6 is undertaken. We therefore increased the sample by including the 24 companies that are also listed on overseas stock exchanges (see Table 1) and included a dummy variable for the overseas exchange listing. The results (untabulated) are similar to those reported. Large or independent boards are more likely to have a best practice audit committee. The exchange listing dummy variable is not significant.

In our main tests, we exclude firm size as a control variable from the reported results because Bradbury (1990: 29) shows that it is highly correlated to board size. He reports that size does not make a marginal contribution to the decision to maintain an audit committee once the number of directors has been considered. Furthermore, given the sample size, we wished to make the model as parsimonious as possible. We examine whether our results are sensitive to the inclusion of a firm size variable. When this is included, board size becomes insignificant while board independence remains significant. Thus, consistent with our priors, including firm size swamps the board size effect.

We also create a dummy variable for blockholding to test whether it was the existence of a blockholder or the size of the blockholding that was more relevant. The results are not sensitive to the use of a dummy blockholder variable.

Alternative dependent variables

We create an ordinal dependent variable of audit quality from the ACEXP and ACIND variables and employ a multinomial logit regression. For this model the dependent variable is set to 0 if both ACEXP and ACIND are zero; 1 if either (but not both) ACEXP and ACIND are 1; and 2 if both ACEXP and ACIND are 1. This allows us to compare audit committees that do not meet the guidelines with those that are partly compliant and to compare the latter with those that are fully compliant. Only leverage is significant (at the 0.05 level) in explaining the incremental audit committee quality between the dependent variable of 0 and 1 whereas BDIND and BDSIZE are significant determinants of audit committee quality when the dependent is between 1 and 2. This suggests that there are some firms (i.e. the lower quality audit committee firms) where audit committee membership is not influenced by board size and composition.

Multicollinearity

Multicollinearity is a potential concern because of the significant correlations between a few variables that can be observed in Table 5. We therefore run an ordinary least squares regression on the ACBP model, to assess the variance inflation factors (VIF) for each variable. The VIF factors range from 1.1 to 1.24, which suggests that multicollinearity is not a problem.

However, there is still a concern over the correlation between leverage (LEV) and growth opportunities (MTB) because of the theoretical relation between these variables and the correlations ob-

served in Table 5. We re-ran the ACBP logit regression dropping LEV and MTB in turn. If MTB is eliminated, LEV is not significant and the model has a lower R^2 and classification ability. When leverage is dropped from the regression, MTB is significant (at the 10% level) and the R^2 and classification ability marginally increase.

Endogeneity

The hypotheses assume that the board characteristics have a unidirectional effect on the composition of the audit committee. However, board and board committee structure may be established simultaneously. That is, while board (BDSIZE) and the percentage of independent directors (BDIND) may affect the composition of the audit committee, the composition of the audit committee may affect board size and the proportion of independent directors. For example, a desire to create an independent audit committee with a financial expert may require the appointment of more directors who are independent or financial experts to the board.

We address this concern using a two-stage approach. We use the lagged board size as an instrumental variable for BDSIZE. The lagged variable is assumed to be a predetermined variable in equation (1) because its value is not determined in the current time period. Therefore, it is assumed that the error term of the model is not correlated with the lagged variable (e.g. Gujarati, 2003: 736).

In the first stage of the approach, BDSIZE is regressed on the other explanatory variables in model (1) plus the lagged value of BDSIZE. Data for BDSIZE for the 2000 year was hand-collected from annual reports. Equation (2) shows the OLS regression:

$$\begin{aligned} BDSIZE_t = {} & \Pi_0 + \Pi_1 LogLEV_t + \\ & \Pi_2 LogEXDIRSH_t + \Pi_3 BLOCK_t + \\ & \Pi_4 BIG5_t + \Pi_5 MTB + \\ & \Pi_6 BDSIZE_{t-1} + \Pi_7 BDIND_t \end{aligned} \quad (2)$$

We normalise LEV and EXDIRSH by taking logs. The other variables are defined in equation 1. In the second stage, the predicted value of BDSIZE replaces the actual value of in the original model. Table 7 contains the results. When the predicted value of board size is included in the model, the results are qualitatively the same as in Table 6. Thus, simultaneity does not seem to be affecting our results.

6. Discussion

Our results have several implications for policy setters. First, the low influence of demand factors suggests that regulation will be necessary to move audit committee quality to international standards. Second, if existing (unconstrained) board structures are optimal from production efficiency perspective, then regulations will require firms to engage additional directors or to change of duties of existing directors.

To gain further insight on the latter issue, we analyse the change in audit committee composition from 1998 to 2001.[11] Over this period, eight firms (15%) moved to achieve best practice audit committee guidelines. For these firms, five firms increased the number of directors, while two firms achieved best practice audit committees by reallocation of tasks within the existing board size. One remaining company reduced the board size by two members over the period and subsequently delisted. Board independence increased for four of the firms, decreased for two of the firms and remained unchanged for two of the remaining companies. Directors fees increased by an average of NZ$10,042 for the eight companies. The change in average directors' fees was positive for all but one of the eight firms. Interestingly, six other firms moved away from best practice guidelines by losing an accounting expert (two cases) or an independent director (four cases) from the audit committee. Only three of these firms reduced board size, in other cases related party transactions and changes in shareholding affected the independence of directors. This suggests that firms choose board structures for operational reasons – or, at least, reasons unrelated to audit committee best practice membership guidelines. As a result, regulations to meet best practice audit committee membership would impose a cost on these firms.

To get some idea of the cost, we analyse the average directors' fees for each firm by audit committee quality (ACEXP and ACIND). This analysis is reported in Table 8. Thirty-five firms have an accounting expert on the audit committee. The median directors' fee for these firms is NZ$31,000, compared to those without an accounting expert of NZ$17,250; a 79.7% increase. Similarly the median directors' fees where ACIND is 1 is 18.7% higher than those firms without an independent audit committee.[12] This suggests the cost, in terms of directors' fees, of increasing audit committee quality will be significant for some firms. Given economies of scale relating to firm size and the strong relation between firm size and board size, smaller firms will incur proportionally more costs than large firms in increasing board size or improving the mix of independent and expert directors. More specifically, the average cost of complying with best practice guidelines will be decreasing with firm size. From a policy perspective,

[11] This analysis is conducted on 52 firms because we lose four observations for firms that were not listed in 1998.

[12] Wilcoxon-matched pairs tests indicate these differences are statistically significant.

Table 7
Test for simultaneity

	Sign	*ACBP Second Stage Logit Coefficient (p-value)*	*BDSIZE First Stage OLS Coefficient (p-value)*
Constant		–7.488 (0.013)	–0.433 (0.261)
LEV	+	–1.702 (0.226)	0.272 (0.193)
EXDIRSH	–	4.749 (0.189)	0.291 (0.435)
BLOCK	–	0.134 (0.468)	0.403 (0.211)
BIG5	+	0.378 (0.391)	0.852 (0.019)
MTB	+	–1.077 (0.097)	–0.129 (0.082)
BDSIZE (predicted)	+	0.551 (0.023)	
BDSIZE (lagged)	+		0.867 (0.000)
BDIND	+	8.347 (0.001)	0.415 (0.225)
–2 Log likelihood		39.128	
Nagelkerke R^2		0.611	
% Predicted correct		83.929	

The variables are described in Table 3. The sample size is 56. p-values are one-tailed.

Table 8
Analysis of average directors' fee per firm (NZ$)

			Increase	*Percentage increase*
	ACEXP=1	ACEXP=0		
Mean	32,661	20,196	12,465	61.7%
Median	31,000	17,250	13,750	79.7%
N	35	17		
	ACIND=1	ACIND=0		
Mean	28,264	28,908	–643	–2.2%
Median	29,675	25,000	4,675	18.7%
N	26	26		

See Table 2 for definitions of variables.

whether such costs should be imposed on firms needs to be weighed against the social benefits of an increase in directors' fees, such as a general improvement in investors' confidence arising from better financial reporting.

7. Summary

Regulators in the US, UK, Australia, and New Zealand require or recommend that listed companies establish audit committees that meet specified membership criteria. These requirements have been made on the premise that if audit committees are appropriately structured (i.e. are of high quality) their effectiveness should improve financial reporting.

This study investigates the characteristics associated with firms that voluntarily established audit committees that meet best practice guidelines for audit committee membership. Our results show that, in a voluntary setting, supply factors (i.e. board size and board independence) are positively related to best practice audit committees. The hypothesised demand factors, such as leverage and growth opportunities, large audit firms have weak or no influence on audit committee membership.

There are two implications of our results for regulators. The first is that if audit committee membership is considered to be crucial for financial reporting, then regulations will be necessary to achieve best practice. Second, if, in a voluntary setting, board composition is optimal for operating purposes, the regulations to achieve audit committee best practice will impose significant costs on some firms.

We note that New Zealand's environment is characterised by smaller firms, more concentrated ownership, and limited resources with regard to directors. Therefore, care should be taken in generalising the results to other settings.

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Determinants of intellectual capital disclosure in prospectuses of initial public offerings

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Abstract—Intellectual capital is recognised as the new economic era's pivotal factor underlying value creation. Deficient and inconsistent intellectual capital reporting is escalating information asymmetry between informed and uninformed investors. This provides fertile ground for informed investors to extract higher abnormal returns and higher wealth transfers from uninformed investors, particularly during a firm's initial public offering (IPO). This study investigates the association between intellectual capital disclosure levels in prospectuses of 444 IPOs listing on the Singapore Stock Exchange between 1997 and 2006, and three potential explanatory determinants: (1) ownership retention; (2) proprietary costs; and (3) corporate governance structure.

Statistical analysis supports our conjecture of a positive association between intellectual capital disclosure and ownership retention. We also find, consistent with expectations, a negative influence of proprietary costs on the positive intellectual capital disclosure – ownership retention association. However, contrary to predictions, we do not find an IPO's corporate governance structure significantly influences the negative interaction of proprietary costs on the ownership retention – proprietary cost association. Our findings have implications for various parties such as regulators who may impose unnecessary costs on issuers if they introduce mandatory disclosures whilst lacking an understanding of the factors influencing intellectual capital disclosures.

Keywords: intellectual capital; disclosure; determinants; Singapore; initial public offerings

1. Introduction

Business dynamics of the 21st century are increasingly determined and driven by intellectual capital/knowledge-based elements. Numerous corporate executives, practitioners and business professionals, policymakers and scholars alike acknowledge factors of production, products and services, and market place dynamics will be radically different than previously. The coming century will by necessity be an integrated and technologically networked global economy, recasting comparative advantages and discriminating pricing for goods and services. In the future business and economic landscape, raw materials and their processing will decline in value whilst that of intellectual capital resources will increase. This clearly calls for a refreshed – if not alternative – understanding of business principles, information reporting and decision-making processes.

Market participants, practitioners and regulators alike argue there is an important need for greater investigation and understanding of intellectual capital disclosure as the usefulness of financial information in explaining firm profitability continues to deteriorate (Lev and Zarowin, 1999). Bukh (2003), for example, asserts that traditional reporting mechanisms are not able to cope adequately with the reporting requirements of new economy firms. Bozzolan et al. (2003), meanwhile, observe an increasing dissatisfaction with traditional financial reporting and its ability to convey to investors the wealth creation potential of firms.

Despite growing interest and demand for intellectual capital information, prior research (e.g. Williams, 2001; Beaulieu, et al., 2002; Garcia-Meca et al., 2005) suggests a persistent and significant variation in the quantity and quality of information reported by firms on this pivotal resource. As existing economic and business metrics track a declining proportion of the real economy, the deficiency and inconsistency in the reporting of intellectual capital-related information is creat-

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ing growing information asymmetry between informed and uninformed investors (Eustace, 2000; Gröjer, 2001; Walker, 2006). This provides fertile ground for informed investors to extract higher abnormal returns.

Opportunities for informed investors to extract higher wealth transfers from uninformed investors are particularly ripe when information asymmetry is naturally high such as a firm's initial public offering (IPO). Liberalisation of financial capital movement, in conjunction with financial market integration, provided an enriched sustainable environment during the past decade for the intensive expansion of numerous capital markets worldwide. A growing proportion of IPOs listing during this period – and with numbers projected to increase in the future – are intellectual capital intensive firms. Greater listing of firms particularly prone to information asymmetry concerns provides an additional incentive to understanding intellectual capital disclosure practices of IPOs.

Despite the increasingly significant role to today's firms, and intensive information asymmetry concerns (particularly within an IPO setting), very few studies have addressed the issue of intellectual disclosure practices by listing firms. Our study addresses this important void in the accounting, finance and intellectual capital literatures. Drawing on signalling theory, we identify and examine three potential determinants that may promote or constrain voluntary intellectual capital disclosure in IPO prospectuses. The three specific determinants investigated are: (1) ownership retention; (2) proprietary costs; and (3) corporate governance structure.

Past IPO literature suggests ownership retention (Leland and Pyle, 1977) is a signal of firm quality. We extend this notion postulating ownership retention is a complementary signal to intellectual capital disclosure. Verrecchia (1983) suggests firms faced with high proprietary costs are likely to limit voluntary disclosure. Based on this contention, it is our conjecture the intellectual capital disclosure–ownership retention association will be suppressed by the extent of proprietary costs faced by an IPO. Previous researchers suggest corporate governance structure can reduce a firm's cost of capital (e.g. Certo et al., 2001). Consequently, our final conjecture is that stronger corporate governance structures mitigate negative influences of higher proprietary costs on the association between intellectual capital disclosure levels and ownership retention.

Singapore is a vibrant environment for investigating issues related to intellectual capital and IPOs. First, with a very small land mass, Singapore's rapid economic growth is primarily driven by development of key intellectual capital resources. Second, Singapore is ranked one of the world's most business-friendly economies (World Bank, 2007). Also, Singapore has a well-established corporate law and governance system (Political and Economic Risk Consultancy (PERC), 2006; The Fraster Institute, 2007).[1] Similarities with regulatory practices in major capital markets will enable results from our study to be generalised more broadly. For example, the corporate regulatory system in Singapore was adapted from the British and still bears close resemblance today. Also, the legal and governance framework is highly aligned with the Commonwealth model such that Singapore is recognised as a corporate governance leader in Asia (Mak and Chng, 2000).[2] Accounting standards in Singapore have long been highly consistent with IAS/IFRS requirements with accounting practices regulated by professional institutions (e.g. Institute of Certified Public Accountant of Singapore (ICPAS); Stock Exchange of Singapore (SGX)) and government bodies (e.g. Accounting Standards Council (ASC)) (ACGA, 2007). The auditing market in Singapore is dominated by Big Four accounting firms (Rusmin et al., 2006) whilst there are sophisticated intermediaries such as security analysts, credit rating agencies and investors acting as market monitors (Mak and Chng, 2000). Finally, Singapore's capital and IPO markets are mature, highly active and internationalised.[3] Comprising two primary boards (SGX Main Board and SGX SESDAQ)[4] the SGX has grown significantly since the late-1990s with the number of firms listed by the end of 2006 having more than doubled (nearly three times) since the start of 1997 (SGX Factbook, 2006).

Statistical analysis is based on a sample of 444 IPOs listing on the Singapore Stock Exchange (SGX)[5] between 1 January 1997 and 31 December

[1] Singapore's corporate governance system is perceived to be the highest in Asia whilst the legal system is also ranked number one in Asia for integrity and lack of corruption (La Porta et al., 1997, 1998; PERC, 2006).

[2] Relative to other Asian nations (and many worldwide) Singapore has been a leader in developing corporate governance practices. For example, since 1990 publicly listed firms in Singapore have been required to have established audit committees. In contrast, audit committees were not formally required in other Asian (and many developed economies like Australia) nations until the late 1990s.

[3] As of 31 December 2006, more than 20% of firms listed on the SGX were domiciled overseas (SGX Factbook, 2006).

[4] Firms wishing to list on the SGX Main Board are subject to higher initial pre-listing performance standards than counterparts listing on the SGX SESDAQ. In essence, the SGX SESDAQ was established to allow younger firms without a lengthier, positive financial performance history access to capital market funding.

[5] The highly internationalised SGX is a pivotal capital market in Asia with listed firms having more than doubled since 1997. We focus on Singapore because the nation's lack of natural resources meaning profitability of Singapore firms is highly dependent upon the development and maintenance of intellectual capital resources. Consequently, intellectual capital disclosure is important to Singapore firms and market participants in enabling better valuations.

2006. We find average intellectual capital disclosure levels in IPO prospectuses increased annually between 1997 and 2006. Statistical tests indicate a significant positive association between intellectual capital disclosure and ownership retention. Additionally, we find a negative influence of proprietary costs on the positive intellectual capital disclosure–ownership retention linkage. Contrary to expectations we do not find better corporate governance structures influence the ownership retention–proprietary cost–intellectual capital disclosure interaction. Our findings have implications for various parties. For example, regulators may impose unnecessary costs on issuers if mandatory reporting is introduced without sufficient understanding of factors influencing intellectual capital disclosure.

Our study contributes to various literatures (i.e. accounting, finance and intellectual capital) in two key aspects. First, our study considers potential determinants of intellectual capital disclosure most befitting of an IPO setting. Previous related work (e.g. Bukh et al., 2005a) generally concentrates on traditionally established disclosure determinants such as firm size, leverage or firm performance. Findings from our study help build an expanded profile of factors influencing intellectual capital disclosure. Second, we draw on the tenets of an established theoretical perspective to consider the underlying rationale motivating disclosure of intellectual capital-related information. This is contrary to prior intellectual capital disclosure determinant research that usually lacks an underlying theoretical foundation to explain why factors selected influence intellectual capital disclosure practices. Application in our study of a specific theoretical perspective can provide a foundation for more constructive theorisation of intellectual capital disclosure practices in the future. Aside from the two major contributions noted we provide other important offerings. For example, our in-depth longitudinal study provides further evidence of growth in quantity of intellectual capital information disclosed during the past two decades. Furthermore, we report about intellectual capital disclosure practices for firms from a nation reliant on intellectual capital not previously examined; thereby, adding an additional piece to the global jigsaw map on intellectual capital disclosure practices. Finally, whilst offering its own individuality Singapore's regulatory and institutional environment overlaps with regulations and requirements observed in major international capital markets. This assists, therefore, in generalising findings from our study to other nations and regions.

The remainder of this paper is organised as follows. The next section outlines the extant literature associated with voluntary disclosure and information asymmetry. This is followed in Section 3 with the formal development of testable hypotheses. The research method is discussed in Section 4 with sample selection, descriptive and statistical results reported in Section 5. Discussion and conclusions are drawn in Section 6.

2. Literature review: voluntary disclosure and information asymmetry

Prior research implies intellectual capital resource-rich firms exhibit more volatile market values and are subject to a higher degree of information asymmetry. Aboody and Lev (2000), for example, report that intangibles (an intellectual capital component) contribute positively to information asymmetry particularly amongst research and development (R&D) intensive firms. Consequently, informed investors achieve abnormal returns (Aboody and Lev, 2000). Amihud and Mendelson (1986) and Lev (2001) also attribute widening bid-ask spreads to information asymmetry. To compensate, investors require higher returns thus driving up the cost of capital.

With respect to intellectual capital Van der Meer-Kooistra and Zijlstra (2001) report that a lack of disclosure related to this pivotal resource increases investors' risk perception. They (Van der Meer-Kooistra and Zijlstra, 2001: 457) argue 'a lack of information about investments in intellectual capital could lead to an underestimation of future earnings' and, thereby, increases the cost of capital. Chan et al. (2001) provide similar findings regarding R&D arguing that lack of disclosure increases the degree of uncertainty (or perceived risk) for R&D intensive firms. Consequently, return volatility intensifies with greater R&D expenditures that are supported by low disclosures. Again, higher cost of capital results. Chan et al., 2001: 2454 argue 'even if market prices on average incorporate the future benefits from R&D, the lack of accounting information on such an important intangible asset may impose real costs on investors through increased volatility.'

To reduce investors' perceived risk and firm value volatility, various studies (e.g. Diamond and Verrecchia, 1991; Elliot and Jacobson, 1994; Coles et al., 1995; Botosan, 1997, 2006; Sengupta, 1998) suggest greater disclosure decreases the required return by investors. Diamond and Verrecchia (1991) and Zhang (2001) develop theoretical models demonstrating the relations between voluntary disclosure and a firm's cost of capital. Diamond and Verrecchia (1991) conclude increased voluntary disclosure results in a reduction in the information asymmetry component of the cost of capital. Information asymmetry arises as a result of the market participants having different levels of information. Zhang (2001), meanwhile, posits private information production by investors leads to a widening information gap between informed

and uninformed investors, resulting in increased cost of capital. Firms can reduce this information asymmetry and, thereby, lower their cost of capital by increasing the level of voluntary disclosure.

Consistent with these views, Lev (1992) also asserts that the existence of a permanent information gap between outsiders and insiders creates the need for a systematic disclosure strategy by firms. Similarly, Leuz and Verrecchia (2000) explored the notion that a firm's commitment to greater disclosure should lower the information asymmetry component of the firm's cost of capital. Leuz and Verrecchia (2000) contend that to overcome the reluctance of potential investors to hold firm shares in illiquid markets, firms must issue capital at a discount leading to fewer proceeds to the firm and, thus, higher cost of capital. Empirical results from Botosan (2000) support this view. Botosan (2000) found the cost of equity capital decreased with increases in the level of two categories of information: forward looking information (forecasts of sales, profits and capital expenditure) and key non-financial statistics (order backlogs, market share and growth in units sold). An important implication of Botosan (2000), therefore, is there is room for improvement in the voluntary disclosure by all firms, especially in the forward looking and non-financial categories.

Healy and Palepu (1993) argue corporate managers issuing equity (or acquiring another company) would consider it important for investors to have a favourable perception of the issuer (or acquirer). Myers and Majluf (1984) point out that entrepreneurs seeking external financing have incentives to make voluntary disclosure to mitigate information asymmetry problems. Empirical evidence of analysts' ratings of disclosure supports the view that firms issuing securities provide greater disclosures (Lang and Lundholm, 1993). In later work, Lang and Lundholm (1997) document a significant increase in disclosure beginning six months prior to the issue of equity, particularly for items over which management has greater discretion. Healy and Palepu (1993) also suggest managers can improve investor communication by developing disclosure strategies that help investors understand managers' business objectives. Voluntary disclosures could include articulation of the firm's long-term strategy, specification of non-financial leading indicators useful in judging the effectiveness of the strategy implementation, discussion of the leading indicators and outlines of present and future joint ventures, strategic alliances and partnerships.[6]

In the IPO context Leland and Pyle (1977) establish a simple model of capital structure and financial equilibrium in which entrepreneurs seek financing of projects whose true characteristics are known only to them. Allen and Faulhaber (1989) assert that an important issue in signalling models is whether the signal being examined would be used if the firm had a wider choice of available signals. IPOs can signal their quality with several variables other than price such as underwriter choice (Booth and Smith, 1986) and auditor (Titman and Trueman, 1986). Allen and Faulhaber (1989) argue price is likely to be just one of several signals used to convey information. Ownership retention is frequently cited as a prime signal of an IPO's quality (Jog and McConomy, 2003). Gonedes (1978), for example, argues IPO managers will use their ownership retention as a signal to complement voluntary disclosures (such as that related to intellectual capital) made in the prospectus. By retaining a higher ownership percentage post-listing, pre-IPO owners signal to investors the firm's quality by accepting greater risk rather that diversifying their interests by retaining less interest in a single entity.

Whilst there appears a general consensus that voluntary disclosure benefits firms accessing capital markets, there are disincentives for managers to make full disclosure. This is because such disclosure would contain proprietary information that would undermine the firm's competitive position (Dye, 1986; Verrecchia, 1983). Empirical studies of the impact of proprietary costs suggest disclosure is hampered by proprietary costs. Scott (1994) carried out an empirical investigation of the proprietary cost implications of defined benefit pension plan (DBPP) disclosures in Canada. He (Scott, 1994) found a significant negative association between the probability of a firm disclosing pension plan information and the potential proprietary costs attached to its labour relations. The larger the proprietary cost, the greater the decrease in firm value, and the greater the incentive not to disclose. Guo et al. (2004) examine the impact of various competitive costs on the extent of product-related information disclosed by biotech IPOs in prospectuses. They (Guo et al., 2004) find biotech firms operate in a highly competitive environment and, therefore, are reluctant to disclose product-related information with high proprietary costs.

An entity's corporate governance structure may mitigate the disincentive to voluntarily disclose key information with high proprietary costs. Stronger corporate governance mechanisms are thought to lower the cost of equity by reducing the cost of external monitoring by outside investors. Lombardo and Pagano (2002), for example, postulate that investors need to incur external monitoring costs to ensure a given pay-off from

[6] Disclosure on issues such as present and future joint ventures, strategic alliance and partnerships or a firm's long-term strategy are representative of disclosures that would fall within the scope of intellectual capital.

management. Additional monitoring costs are compensated by a higher required rate of return. External investors are likely to demand a lower required rate of return from firms with better corporate governance. This is because they can spend less time and resources on monitoring the management. Corporate governance can also reduce the cost of equity by limiting opportunistic insider trading, thereby, reducing information asymmetry. Battacharya and Daouk (2002), for example, find the cost of equity in a country decreases significantly after the first prosecution under insider trading laws. If corporate governance mechanisms reduce the cost of capital then this provides greater scope for firms to voluntarily disclose more information even in light of high proprietary costs. Recent evidence from the UK suggests that stronger corporate governance structures are associated with increased intellectual capital disclosure (Li et al., 2008).

3. Hypothesis development

The bulk of early empirical studies examined intellectual capital disclosure in the context of annual reports (Guthrie and Petty, 2000; Brennan, 2001; Beaulieu et al., 2002) with some more recent work undertaking comparative analysis across international boundaries (Bozzolan et al., 2006; Vergauwen and van Alem, 2005). Only a few studies have considered intellectual capital disclosure in IPO prospectuses (Guo et al., 2004; Bukh et al., 2005a). Bukh (2003: 51–52) states 'the prospectus indicates which type of information is selected by a company and its advisers for the best possible visualisation of the company's value creation potential in relation to investors and analysts because the prospectus intends to prove continued growth and increased shareholder wealth'. Bukh (2003) concludes that the inclusion of information on intellectual capital in prospectuses is an indication that companies and their advisers believe this type of information is important in the capital market's assessment of the value of the company.

Consistent with prior research (e.g. Diamond and Verrecchia, 1991; Botosan, 1997, 2006; Sengupta, 1998) it is our general contention that voluntary disclosure of intellectual capital information will reduce a firm's cost of capital. As per Section 2 discussion, we contend that within an IPO setting, the extent of intellectual capital disclosure depends upon signalling mechanisms, proprietary costs and the firm's corporate governance structure. Specifically, we propose since intellectual capital disclosures are not as easily interpreted by investors (given the lack of a recognised reporting framework), management must incur costly signals such as higher fractional ownership post-listing to complement direct disclosure signals (Hughes, 1986). Firms entering highly competitive industries, however, may elect to restrict voluntary disclosures (Darrough and Stoughton, 1990), particularly those associated with intellectual capital (Guo et al., 2004), even with high levels of ownership retention. Finally, strong corporate governance structures may override high proprietary costs negative influence associated with disclosure (such as intellectual capital information) leading to increased reporting (La Porta et al., 1997; 1998).

Formal hypotheses to test our general conjecture of ownership retention, proprietary costs and corporate governance structure influences are developed in the following sub-sections.

3.1. Ownership retention

Certo et al. (2001) argue two central tenets of signalling theory are: (1) a signal must be observable and known prior to the IPO; and (2) the signal must be more costly for lower quality IPO firms to mimic. We take the perspective that the proportion of shares retained by the original owners is a signal observable in the prospectus document and one lower quality firms find costly to imitate. Specifically, owners of low quality firms would want to diversify as much personal risk as possible by attempting to sell as many of their IPO shares as possible (Downes and Heinkel, 1982).

Leland and Pyle (1977) developed an equilibrium signalling model which predicts the behaviour of the entrepreneur faced with information asymmetry. In Leland and Pyle's (1977) model, it is implied that the entrepreneur's willingness to invest in his own project signals to the market that the project is of good quality. It is costly for the entrepreneur to retain a significant ownership stake in the firm as this action would preclude the entrepreneur from diversifying his personal investment portfolio. Therefore, the entrepreneur will only retain a significant ownership interest if expected future cash flows are higher relative to the current firm value (Leland and Pyle, 1977). Rational investors observe fractional ownership retained as a signal of firm value.

Firth and Liau-Tan (1998) argue that entrepreneurs disclose information that signals their private knowledge of the firm in order to add credibility to the basic valuation parameters contained in the prospectus (information on assets, historical profitability, economic prospects, investment plans, etc.). Firth and Liau-Tan (1998) also found that fractional ownership of the firm by the original pre-issue shareholders is a major signalling mechanism. Their (Firth and Liau-Tan, 1998) findings indicate the level of ownership retained by pre-IPO owners is used as a complementary signal. Research on intellectual capital disclosure determinants is scarce. Similarly, research on intellectual capital underpinned by sig-

nalling theory is virtually non-existent. Bukh et al. (2005a) is one exception reporting that the extent of managerial ownership prior to the IPO is significantly associated with the level of intellectual capital disclosure. Firms where management had an ownership interest upon listing disclosed more intellectual capital information (Bukh et al., 2005a).

Overall, the IPO literature implies ownership retention is a key signal to the market of a firm's quality. A good quality IPO, however, is likely to use multiple signals such as greater voluntary disclosure to entice investors to view it favourably (Jog and McConomy, 2003). Based on this premise, good quality IPOs (proxied by higher levels of ownership retention) and specifically their directors are more likely to provide greater disclosure to substantiate the value of the IPO. Therefore the following hypothesis is proposed:

H1 There is a positive association between the extent of intellectual capital disclosure and the level of ownership retention at the IPO.

3.2. Proprietary costs

Proprietary information is 'information whose disclosure reduces the present value of cash flows of the firm endowed with the information' (Dye 1986: 331). For this study, proprietary costs are viewed as a moderating variable given the highly proprietary nature of intellectual capital disclosure. That is, the impact of ownership retention on the level of intellectual capital disclosure will be moderated (negative direction) by the existence of proprietary costs for the IPO firm.

Theoretical models developed by Verrecchia (1983) suggest the threshold level of disclosure increases as the proprietary costs increase. Verrecchia (1983) suggests the nature of competition is pertinent in determining the level of disclosure. For example, product market competition may provide disincentives for voluntary disclosure (Guo et al., 2004). Further, Darrough and Stoughton (1990) assert that while voluntary information aids the capital market in evaluating the firm's value more accurately, such disclosure could compromise the firm's competitive position by revealing strategic information to potential competitors.

Beaulieu et al. (2002) find a positive relationship between the size of Swedish publicly listed firms and the total amount of intellectual capital provided in their respective annual reports. It is speculated that the lack of disclosure amongst smaller firms on intellectual capital matters could be due to threats of competitive disadvantage (Beaulieu et al., 2002). Williams (2001), meanwhile, finds that when intellectual capital performance[7] is too high, disclosure is reduced. The negative association supports the notion that firms reduce intellectual capital disclosures when performance reaches key threshold levels for fear of eroding competitive advantages (Williams, 2001). A recent study of biotech IPOs by Guo et al. (2004) investigates the impact of several competitive cost proxies on the extent of product-related information disclosed. Results indicate disclosure levels are significantly higher for firms with patent protection for their products compared to firms with no patent protection. Similar results are yielded for the other variables such as product development stage and venture capital backing (Guo et al., 2004).

Given the proprietary nature of intellectual capital information and the implications of prior studies, it is expected that firms with higher proprietary costs will result in a weakening of the positive association between ownership retention and the level of intellectual capital disclosure. This leads to the second hypothesis:

H2 The positive association between the extent of intellectual capital disclosure and the level of ownership retention will be weaker for firms with higher levels of proprietary costs.

3.3. Corporate governance structure

Prominent work by La Porta et al. (1997, 1998) highlights the potential association between corporate governance and disclosure patterns. Recent studies suggest board independence is a specific feature of corporate governance that affects corporate disclosures. Using data from Singapore, Eng and Mak (2003) hypothesised a positive association between the proportion of outside directors and the level of voluntary disclosure. Chen and Jaggi (2000) find comprehensive disclosures are positively related to the proportion of independent non-executive directors on corporate boards. Li et al. (2008) find a positive association between the proportion of independent directors and intellectual capital disclosure in the UK. These results suggest external directors play a complementary role to disclosure.

Gompers (1995) argues that in the presence of information asymmetry which is prevalent for start-up firms, an independent board structure is essential for effective monitoring. As a minimum the independent board may signal the presence of an effective monitoring mechanism, thereby, enhancing firm value (Certo et al., 2001). Fama and Jensen (1983) posit a board comprised mainly of outside directors may promote the implementation

[7] Intellectual capital performance is the increase or decline across a period of time in a firm's (a) wealth, (b) efficient output of physical assets; (c) competitive advantage; and (d) value of other types of capital that results from the activities and actions undertaken by corporate management to efficiently utilise, manage and develop the firm's intellectual capital resources (Williams, 2001).

of effective controls over reporting. Gul and Leung (2004), meanwhile, examined the linkages between board leadership structure in terms of CEO duality (CEO who jointly serves as board chair), the proportion of expert outside directors on the board and voluntary corporate disclosures. They (Gul and Leung, 2004) find CEO duality is associated with lower levels of voluntary corporate disclosures. However, the negative CEO duality/voluntary disclosure association is weaker for firms with a higher proportion of expert outside directors on the board.

Based on the above discussion this study postulates that sound corporate governance features (such as board independence) negate the weakening effects of proprietary costs on the level of intellectual capital disclosure in IPO prospectuses. This leads to the third and final hypothesis:

H3 The interaction effect of proprietary costs on the association between the extent of the intellectual capital disclosure and ownership retention will be weaker for firms with a stronger corporate governance structure.

4. Research method

This section outlines the proxy measures for the dependent, independent and control variables, and defines the main statistical model used to test the hypotheses.

4.1. Dependent variable metric

Prior research examining disclosure typically rely on either a: (1) researcher constructed disclosure index (e.g. Botosan, 1997; Guo et al., 2004); or (2) publicly available disclosure quality indicator (e.g. Lang and Lundholm, 1993, 1997; Sengupta, 1998). No public intellectual capital disclosure indicator is presently available; thus, we construct our own index. Initial selection of intellectual capital disclosure items is based on three prior indices (Williams, 2001; Beaulieu et al., 2002; Bukh et al., 2005a) previously used to measure intellectual capital disclosure in either annual reports or IPO prospectuses (Bukh et al., 2005a). All three indices were reviewed to determine overlapping items. A composite disclosure index comprising 89 items is formed. A further eight items (not contained in any of the three noted indices) is added after further consideration of the Singapore business environment and recent developments in intellectual capital research and practice. All 97 items are then comprehensively scrutinised for relevance and suitability to the study's objectives. Scrutiny involved discussions between the researchers, intellectual capital scholars and practitioners, corporate executives and accounting practitioners. From this extensive review 16 items were excluded. This left a final disclosure index comprising 81 items covering six major categories: (1) human resources; (2) customers; (3) information technology; (4) processes; (5) R&D; and (6) strategic statements. The full index is presented in Appendix A.

To minimise scoring subjectivity we use an unweighted[8] dichotomous scale (one (1) if item disclosed, otherwise zero (0)) to score each item.[9] An IPO's intellectual capital disclosure ($ICDisc_j$) level is defined as the ratio of items disclosed in the prospectus of IPO j to the total number disclosure items applicable to IPO j. The ratio, as a percentage, is arithmetically defined as:

$$\frac{\sum_{ij} DItem_i}{\sum_{ij} ADItem_i}$$

Where:

$DItem_i$ = IC disclosure index item disclosed by IPO_j in its prospectus;

$ADItem_i$ = IC disclosure index item applicable to IPO_j;

i = IC disclosure index item; and

j = IPO firm.

4.2. Independent and moderating variables metrics

4.2.1. Ownership retention

Consistent with the IPO literature we define ownership retention (denoted α_j) as the percentage of outstanding common shares retained by *pre*-IPO shareholders to total shares outstanding after the IPO (e.g. Clarkson et al., 1992; Firth and Liau-Tan, 1998). For purposes of the regression analysis a transformation based on the natural logarithm

[8] An unweighted or weighted scoring approach can be used for scoring. Prior research (Cooke, 1989; Marston and Shrives, 1991; Ho and Williams, 2003) reports either approach typically yields similar results.

[9] Various steps were taken to ensure consistency in scoring of intellectual capital disclosure in each prospectus examined. For example, before commencing scoring of all the prospectuses a random sample of 20 were scored by each author. Scores were then compared and any discrepancies noted. The authors then discussed any major discrepancies to resolve any noted differences in scoring. The review of coding and discussion of discrepancies was concluded again once all prospectuses had been coded by both authors. An additional check for consistent scoring by the authors involved the use of several independent coders throughout the coding process. That is, an independent coder was given a randomly selected sample of prospectuses (completed by the authors) for coding. Results of the coding by the independent coder were then compared to the two authors for any major discrepancies. Results of coding by the independent coders did not yield any major differences with results developed by the two authors. Independent coders included accounting professionals, investors familiar with IPO prospectuses and academic scholars.

of α_j is performed. The transformation defined by the equation $\alpha_j + \text{Ln}(1 - \alpha_j)$ is based on the approach of Downes and Heinkel (1982) and consistent with the technique as used by and defined by Jog and McConomy (2003). The transformation is performed to reduce any anomalies in the distribution of ownership retention. The post-transformation proxy values are denoted as $EDOR_j$.

4.2.2. Proprietary costs

Competitiveness in a given industry has been applied as a proxy for the proprietary costs faced by a firm in prior literature (e.g. Verrecchia, 1983; Berger and Hann, 2007).[10] Consistent with this literature we use a Herfindahl Index as the proxy measure for proprietary costs as defined by the following technique:

$$HerfIndCon_j = \sum_{j=1}^{N} [MarketShare_j]^2 = \sum_{j=1}^{N} \left[\frac{Sales_j}{\sum_{kl}^{N} Sales_{kl}} \right]^2$$

Where:

$HerfIndCon_j$ = measure of the industry concentration of the industry$_l$ to which firm$_j$ is entering.

$MarketShare_j$ = Market share of firm$_j$ within industry$_l$ to which it is entering.

$Sales_j$ = Sales of firm$_j$ for year immediately prior to its IPO as reported in the IPO prospectus.

$Sales_{kl}$ = Sales as reported in the annual report of firm$_k$ in industry$_l$ for year immediately prior to the IPO of firm$_j$ entering industry$_l$.

N = number of firms in industry$_l$.

4.2.3. Corporate governance structure

For this study, a composite measure of corporate governance (defined as $CGScore_j$) is developed such that IPO_j is given a score of one (1) (otherwise zero (0)) for each of the following conditions in the corporate governance structure met at the time of listing: (a) number of independent directors on the board of directors at time of IPO exceeds the mandatory minimum; (b) the same individual does not occupy the roles of chairman of the board and chief executive officer; and (c) the chairman of the board of directors is a non-executive director independent of management. The $CGScore_j$ value for IPO_j, therefore, ranges from 0–3.

4.3. Control variables

To formally test if intellectual capital disclosures assist investors in determining the value of an IPO beyond typical and complementary disclosures, and other signalling methods available to issuers we include a number of control variables into the analysis. Firth and Liau-Tan (1998) report a significant association between underpricing and an issuer's selection of an auditor. A higher quality IPO signals key information to market participants about the IPO's value by engaging an auditor with high reputation capital (Firth and Liau-Tan, 1998). Chen and Mohan (2002) put forward a similar argument for underwriter prestige. To control for the possible compounding signalling effects of auditor reputation we include a control variable denoted Aud_j. Following prior research (e.g. Firth and Liau-Tan, 1998; Jog and McConomy, 2003) IPO j is scored one (1) if engaging a Big Four[11] audit firm at the time of listing; otherwise IPO j is scored zero (0).

We also control for underwriter prestige consistent with past IPO research (e.g. Chen and Mohan, 2002). Without any defined ranking of underwriters in Singapore and some data availability issues we are not able to measure underwriter prestige using many of the techniques applied using data from the US. Nonetheless, we use a modified approach of Johnson and Miller (1988) and Megginson and Weiss (1991). Specifically, the prestige ($Pre_{k,i}$) of underwriter k in year i is measured as the ratio of the number of IPOs underwrit-

[10] Several approaches have been applied in the literature to measure proprietary costs. Whilst the main results reported in this study focus on industry competitiveness (as measured by the Herfindahl Index) we did consider alternative proxies for proprietary costs. For example, we also used (a) the level of research and development and (b) the number of copyrights and patents. Tests using the alternative measures yield results consistent with those using the Herfindahl Index though it is noted the significance of the association between proprietary costs and level of intellectual capital disclosure is slightly stronger for the alternative measures. However, due to concerns with consistency of data to measure the amount of R&D, and the number of copyrights and patents the authors elected to use (and report main finding) the more conservative Herfindahl Index due to greater confidence in the consistency of the data used in the measure.

[11] The term Big Four is not entirely applicable across the full observation period. In 1997 and 1998 it was widely recognised that the audit market worldwide was dominated by six major audit firms (dubbed the Big Six). At the start of 1999 two of the Big Six (Coopers and Lybrand and Price Waterhouse) had merged to form PriceWaterhouseCoopers (or PWC). For IPOs listing in 1997 and 1998 that engaged one of the Big Six firms as the external auditor were scored one (1); otherwise zero (0). In 2002 the Big Five became the Big Four after the demise of Arthur Andersen. Thus, for our study IPOs listing in 1999 to 2001 are scored one (1) if the IPO j engages an audit firm comprising the Big Five; otherwise IPO j is scored zero (0). From 2002 onwards the Big Four classification is used such that if the IPO j engages an audit firm comprising the Big Five; otherwise IPO j is scored zero (0). Whilst the term Big Four is not applicable for the entire period we solely use the phrase Big Four in the main text to avoid confusion.

ten by underwriter k in year i to the total number of IPOs in year i. Underwriters with higher Pre_k ratios in year i have higher levels of prestige capital at stake in year i relative to other underwriters and will seek to reduce underpricing (Jog and McConomy, 2003). For the control variable Und_j a score of one (1) is assigned to IPO j listing in year i if the underwriter k used by IPO j is one of two underwriters with the highest Pre_k ratios in year i. All other IPOs are scored zero (0).

Prior research indicates litigation risk may influence underpricing (Hughes and Thakor, 1992; Keloharju, 1993). Whilst litigation risk in Singapore is low, legal issues related to an IPO remain highly complex. To signal to the market information about the IPO's commitment to avoiding legal disruptions (during and after listing), promoters of a high quality IPO may be inclined to engage solicitors that are highly conversant in the IPO process. For their part, solicitors routinely dealing in IPO matters have an incentive to deal predominantly with high quality firms to protect their reputation capital as leading legal advisors on IPO issues. There is no definitive method to measure solicitor reputation. Hence, for this study we apply the approach as for underwriter prestige in following Johnson and Miller (1988) and Megginson and Weiss (1991). That is, the reputation ($Rep_{k,i}$) of solicitor firm k in year i is measured as the ratio of the number of IPOs undertaken by solicitor firm k as the lead solicitor firm in year i to the total number of IPOs in year i. Solicitor firms with higher Rep_k ratios in year i will have higher levels of reputation capital at stake in year i and will seek to reduce underpricing. For the control variable Sol_j a score of one (1) is assigned to IPO j listing in year i if the solicitor firm k used is one of two solicitor firms with the highest Rep_k ratios in year i. All other IPOs are scored zero (0).

Researchers (Koh and Walter, 1989; Kim and Ritter, 1999; Su and Fleisher, 1998) suggest the level of *ex ante uncertainty* is likely to be less in highly leveraged IPOs. Debt, therefore, may act as a credible signal of the IPO's quality. With higher debt the threat of bankruptcy imposes harsher budget constraints on managers, limits management's control over cash flows, and raises the risk to a firm's undiversified stock ownership (Levis, 1990). Lower quality firms are less likely to be willing to assume the additional concerns associated with high debt as they have a higher chance of being forced into bankruptcy. To control for signalling effects of leverage (Lev_j) we use the book value of total debt divided by the book value of the total assets of firm j as reported in the last financial period preceding the IPO.

We also control for bonus or stock option plans in executive compensation packages as their presence suggests a higher degree of information asymmetry. This presumption is based on the premiss that bonus or stock option plans are contingent on future net income and share price performance. This is likely to influence the incumbent management's time horizon. On average, IPO managers with bonus and stock options as part of their executive compensation packages have greater access to private information about future earnings than other stakeholders. IPO managers can use their inside information to optimise any bonus or stock option provisions to benefit their own self-interests rather than the interests of future shareholders. If outside stakeholders have the same information as IPO managers this may influence valuations of the IPO. For the control variable $ExeCP_j$ IPOs with a bonus or stock option plan as part of executive compensation packages is scored one (1), otherwise zero (0).

Finally, we include two controls for *ex ante uncertainty*: (1) offering size ($LnGP_j$) is measured as the natural logarithm of gross proceeds of the IPO as per the prospectus; and (2) prior operating history of the IPO (Age_j) is the natural logarithm of the number of days from the date of the firm's incorporation to the IPO date. Beatty and Ritter (1986) find when using the inverse of the gross proceeds from the offering (or one plus the number of uses of the proceeds) as a measure of *ex ante uncertainty*, smaller offerings are more 'speculative'. Prior research (e.g. Beatty, 1989; Clarkson, 1994; Clarkson and Merkley, 1994) also shows a negative and significant association between firm age and underpricing.

Proxy measures for all variables are defined and summarised in Table 1.

4.4. Main model specification and statistical tests

This study uses various statistical tests (univariate and tests of correlation) to analyse the data. The hypotheses are tested formally through multiple regression analysis. To formally test the three hypotheses developed for this study three specific regression models are estimated as follows:

$$ICDisc_j = \lambda_j + \beta_1 EDOR_j + \gamma_1 Aud_j + \gamma_2 Undj + \gamma_3 Sol_j + \gamma_4 Lev_j + \gamma_5 ExeCP_j + \gamma_6 LnGP_j + \gamma_7 Agej + \eta_j \quad (1)$$

$$ICDisc_j = \lambda_j + \beta_1 EDOR_j + \beta_2 HerfIndCon_j + \beta_3 EDOR_j{*}HerfIndCon_j + \gamma_1 Aud_j + \gamma_2 Und_j + \gamma_3 Sol_j + \gamma_4 Lev_j + \gamma_5 ExeCP_j + \gamma_6 LnGP_j + \gamma_7 Age_j + \eta_j \quad (2)$$

Table 1
Summary variables and their proxy measure determination

Variable title	*Variable description*
$ICDisc_j$	Ratio of the number of intellectual capital items i disclosed by IPO firm j in their prospectus to the number of intellectual capital items i applicable to firm j expressed as a percentage.
$EDOR_j$	α_j is calculated as $\alpha = (N - N_p - N_s)/N$ where N = number of common outstanding shares after the IPO of firm j, N_p = number of primary common outstanding shares offered via the IPO of firm j and N_s = number of secondary common outstanding shares offered via the IPO of firm j (note that α_j is expressed as a ratio in isolation). For the regression analysis (and application of the interaction terms) a transformation based on the natural logarithm α_j is then performed based on the following equation: $\alpha_j + \ln(1 - \alpha_j)$. This approach is consistent with prior literature (e.g. Downes and Heinkel, 1982; Clarkson et al., 1992; Jog and McConomy, 2003). $EDOR_j$ is used to denote the outcome of the transformation.
$HerfIndCon_j$	$HerfIndCon = \sum_{j=1}^{N}[MarketShare_j]^2 = \sum_{j=1}^{N}\left[\frac{Sales_j}{\sum_{kl}^{N} Sales_{kl}}\right]^2$ **Where:** $HerfIndCon$ = measure of the industry concentration of the industry$_l$ to which firm$_j$ is entering; $MarketShare_j$ = Market share of firm$_j$ within industry$_l$ to which it is entering; $Sales_j$ = Sales of firm$_j$ for year immediately prior to its IPO as reported in the IPO prospectus; $Sales_{kl}$ = Sales as reported in the annual report of firm$_k$ in industry$_l$ for year immediately prior to the IPO of firm$_j$ entering industry$_l$; and N = number of firms in industry$_l$.
$CGScore_j$	Firm$_j$ is given a score of one (1) (otherwise zero (0)) for each of the following conditions in the corporate governance structure met at the time of the IPO: (a) number of independent directors on the board of directors at time of IPO exceeds the mandatory minimum; (b) the same individual does not occupy the roles of chairman of the board and chief executive officer; and (c) the chairman of the board of directors is a non-executive director independent of management. Firm$_j$ score can range from 0–3.
$EDOR_j$*$HerfIndCon_j$	Two-way interaction term. Definitions for $EDOR_j$ and $HerfIndCon_j$ are defined above.
$EDOR_j$*$CGScore_j$	Two-way interaction term. Definitions for $EDOR_j$ and $CGScore_j$ are defined above.
$HerfIndCon_j$*$CGScore_j$	Two-way interaction term. Definitions for $HerfIndCon_j$ and $CGScore_j$ are defined above.
$EDOR_j$*$HerfIndCon_j$*$CGScore_j$	Three-way interaction term. Definitions for $EDOR_j$, $HerfIndCon_j$ and $CGScore_j$ are defined above.
Aud_j	An indicator variable where IPO firm j is scored one (1) if it engages a Big Four audit firm as the auditor; otherwise scored zero (0).
Und_j	An indicator variable where IPO firm j is scored one (1) if it engages either of the top two underwriter firms (based on frequency) in the year of the firm's IPO; otherwise scored zero (0).
Sol_j	An indicator variable where IPO firm j is scored one (1) if it engages either of the top two solicitor firms (based on frequency) invited to the IPO in the year of the firm's IPO; otherwise scored zero (0).

Table 1
Summary variables and their proxy measure determination *(continued)*

Variable title	*Variable description*
Lev_j	Ratio of book value of total debt (expressed in Singapore Dollars (SGD)) for IPO firm *j* to total book value of total assets (expressed in (SGD)) of IPO firm *j* in the accounting period immediately preceding the IPO as per the prospectus.
$ExeCP_j$	An indicator variable where the IPO firm *j* is scored one (1) if the firm has a bonus or stock option component as part of its executive compensation plan; otherwise scored zero (0).
$LnGP_j$	Natural logarithm of the gross proceeds (based on the gross proceeds of the IPO as per the prospectus) to be received by firm *j* from the IPO (expressed in SGD).
Age_i	Natural logarithm of the number of days from the date of incorporation of firm *j* to the date of the IPO.

$$ICDisc_j = \lambda_j + \beta_1 EDOR_j + \beta_2 HerfIndCon_j + \beta_3 EDOR_j{*}HerfIndCon_j + \beta_4 CGScore_j + \beta_5 EDOR_j{*}CGScore_j + \beta_6 HerfIndCon_j{*}CGScore_j + {}_7\beta_7 EDOR_j{*}HerfIndCon_j{*}CGScore_j + \gamma_1 Aud_j + \gamma_2 Und_j + \gamma_3 Sol_j + \gamma_4 Lev_j + \gamma_5 ExeCP_j + \gamma_6 LnGP_j + \gamma_7 Age_j + \eta_j \quad (3)$$

Where:

Formal definitions are presented in Table 1;

λ_j = the coefficient on the intercept term;

β_i = the coefficients 1–7 on the independent and interaction variables;

γ_i = the coefficients 1–7 on the independent and interaction variables; and

η_j = the error term.

Support for H1 acceptance is derived if the coefficient β_1 on the independent variable $EDOR_j$ is found to be statistically significant at conventional levels and with a positive directional sign in regressions based on Equations 1, 2 and 3. In the context of H2, this hypothesis will be supported if the coefficient β_3 on the interaction variable $EDOR_j{*}HerfIndCon_j$ is statistically significant at conventional levels and the directional sign is negative in regressions based on Equations 2 and 3. Finally, there will be support to accept H3 if the coefficient β_7 on the interaction variable $EDOR_j{*}HerfIndCon_j{*}CGScore_j$ is statistically significant at conventional levels with a positive directional sign in regressions based on *Equations 3*.

5. Sample and results

5.1. Sample selection and industry distribution

Our initial sample comprises SGX IPOs satisfying the following criteria:

I. The IPO applied for initial listing on the SGX between 1 January 1997 and 31 December 2006 (based on listings from the SGX).

II. The IPO issued equity shares not previously publicly traded, and whose fiscal year end was prior to or on 31 December 2006.

III. The IPO is not a life investment fund, stock index fund, real estate unit fund or limited partnership.

IV. The IPO did not issue preferred shares only.

V. The IPO did not provide a prospectus as part of a cross-listing arrangement.

Of the 516 firms applying for a SGX listing between 1997 and 2006, 444 meet our prescribed criteria. Of those not meeting the criteria 27 were seasoned offerings, 27 unit fund related issues and five issuing only preferred shares. Another 13 IPOs are excluded: (i) due to insufficient prospectus information to construct the proxy measures; or (ii) incomplete prospectuses to enable measurement of intellectual capital disclosures. Our final useable sample comprises 86.05% of total IPOs during the review period. A breakdown of the sample selection by year is reported in Table 2, Panel A. The annual breakdown indicates IPO activity is particularly high during two sub-periods: (1) 1999–2000; and (2) 2004–2006. Strong IPO activity during 1999–2000 is synonymous with the hype surrounding the 'Internet Bubble' as found in

Table 2
Breakdown of sample selection process

Panel A: Sample selection

	Listing	*Reason for exclusion from sample*				*Included in sample*	
Year	*N*	*Seasoned offering*	*Fund types*$^{\Phi}$	*Preferred shares*	*Insufficient data*$^{\varphi}$	*N*	*% Total listing*
1997	15	2	1	0	1	11	73.33
1998	23	2	0	0	1	20	86.96
1999	51	3	2	0	2	44	86.27
2000	82	7	5	3	4	63	76.83
2001	37	3	1	0	0	33	89.19
2002	33	2	3	0	1	27	81.82
2003	60	4	2	1	2	51	85.00
2004	80	2	0	1	0	77	96.25
2005	69	1	4	0	1	63	91.30
2006	66	1	9	0	1	55	83.33
Total	**516**	**27**	**27**	**5**	**13**	**444**	**86.05**

Panel B: Industry composition of sample

Code	*SIC industry class description*	*N*	*% Sample*
A	Agriculture, Forestry and Fishing	7	1.58
B	Mining	3	0.68
C	Construction	24	5.41
D	Manufacturing	214	48.20
E	Transportation, Communications, Electric, Gas and Sanitary Services	41	9.23
F	Wholesale Trade	30	6.75
G	Retail Trade	15	3.38
H	Finance, Insurance and Real Estate	9	2.03
I	Services	97	21.84
J	Public Administration	4	0.90
	Total	**444**	**100.00**

Where:
Φ – Offerings categorised in this group included life investment funds, stock index funds and real estate funds that issued unit trusts via the SGX.
φ – IPOs classified as 'Insufficient Data' typically included those where a verifiable copy of the original prospectus could not be obtained, or IPOs where a prospectus was obtained but necessary information relevant to this study (such as for determining key variables) was not available.

other major capital markets (Ljungqvist and Wilhelm, 2002; Loughran and Ritter, 2002; Ofek and Richardson, 2003). High IPO activity in Singapore from 2004 through 2006 can be attributed, in part, to a growing enthusiasm for: (a) attracting China-based firms; or (b) investment into Singapore incorporated firms that are developing and/or expanding operations in China. Low IPO activity in 1997–1998 and 2001–2003 is likely due to poor economic conditions.[12]

An industry breakdown (US SIC single-digit classification) shown in Table 2, Panel B shows nearly 50% of the IPOs representation were from the manufacturing sector (i.e. 214 of 444 or 48.20%). The strong representation of IPOs from the manufacturing sector is consistent with underlying dominance of this industry sector in Singapore. The services sector is also strongly represented with 21.84% (i.e. 97 of 444) of the IPOs being classified into this business sector. Given Singapore's lack of natural resources it is not surprising few mining firms listed on the SGX (i.e. 3 or 0.68%). Mining sector firms listing on the SGX generally had extensive mining operations in Indonesia, Malaysia or Vietnam.

[12] In late 1997, for example, Singapore (like other Asian nations) was savaged by the Asian Financial Crisis that lingered into 1998. Whilst in the midst of an economic recession in 2001–2002 Singapore's economic prosperity was further dampened by the SARS crisis.

5.2. Descriptive results

Table 3, Panel A reports an annual breakdown of the raw amount of intellectual capital disclosure. Average raw total intellectual capital disclosure rises yearly from 15.091 items in 1997 to a peak of 28.863 items in 2003 followed by a decline in 2004 (24.429 items) and 2005 (22.175 items) before a rebound in 2006 (26.145 items). An ANOVA test (not tabulated) did not indicate significant variations in the annual average total raw intellectual capital disclosure across the study period. Bukh et al. (2005a) is presently the only study enabling any meaningful longitudinal comparison.[13] They (Bukh et al., 2005a) report an annual upward trend in IC disclosure in Danish IPO prospectuses from 1990 to 1999 with a slight decline in 2000 and 2001.[14] Comparatively, average raw intellectual capital disclosure for Singapore IPOs is marginally below Danish IPOs from 1997 to 2001 (the period during which both studies overlap).[15]

An annual raw disclosure breakdown by major intellectual capital categories is also reported in Table 3, Panel A.[16] Changes in raw disclosure associated with human resource, customer and process capital follows a similar path (i.e. upward annually from 1997–2003 with a decline in 2004 and 2005, and then rising in 2006) to total raw intellectual capital disclosure. Average raw disclosure on information technology capital spiked in 1999 (1.159 items) followed by an annual decline. Disclosure related to information technology capital again spikes in 2003 (0.882) before two further years of moderation before a third spike in 2006 (0.891 items). This pattern of spikes followed by declines could be systematic of fluctuations in expenditure and attention to information technology that could follow cyclical paths. Average raw R&D capital disclosures fluctuated between 1997 and 2002 before a rise and stabilisation in 2003 and 2004. There is a dip in 2005 with a rebound in the subsequent year. Besides two anomalies in 1997 and 2003 the average raw disclosure for strategic capital is quite flat though with a sharp rise in 2006 relative to prior years.

An annualised breakdown of average $ICDisc_j$ scores is reported in Table 3, Panel B. Consistent with average raw total disclosures the average $ICDisc_j$ scores increased annually from 1997 to 2003 (18.631% to 35.633%) before a pullback in 2004 (30.159%) and 2005 (27.376%). This is followed by an increase in 2006 (32.278%). An ANOVA test (not tabulated) did not indicate significant variations at conventional levels between the annual average $ICDisc_j$ scores.

Descriptive statistics for the independent variables (based on pooled sample) are reported in Table 3, Panel C.[17] Statistical tests (not tabulated) show only the mean annual values for $EDOR_j$ and Age_i differ significantly. Of 2001 IPOs (and to some degree 2002 IPOs) average retained ownership and age is significantly higher than 2004–2005 IPOs. Poor economic conditions in Singapore in 2001 may partially explain this observation. With the economy struggling, only high quality firms (indicated by a higher level of retained ownership and/or a longer established record) would have found it viable to list. A more buoyant economy in 2004–2006 would have provided a higher likelihood of reasonable returns. Thus, a higher number of lower-quality firms and/or those with a shorter prior operating history would have been attracted to list in 2004–2006 as opposed to 2001. The average $HerfIndCon_j$ score (0.192) indicates business sectors being entered by IPOs between 1997 and 2006 were moderately to highly concentrated. This result is consistent with prior views that business sectors in Singapore are dominated by large sector leaders that capture the majority of sales turnover. The average corporate governance score for the pooled sample (i.e. 2.321) implies that upon listing on the SGX IPOs were, in general, well governed. However, descriptive statistics for $CGScore_j$ also indicate variations in standards.

[13] Bukh et al., (2005b) measure IC disclosures of a sample of Japanese firms using the Bukh et al., (2005a) index but only for a single year (i.e. 2003). Strom (2005) also measures intellectual capital disclosures in prospectuses of Swedish IPOs. His index (Strom, 2005) comprises fewer items and focuses on specific subsets of intellectual capital from Bukh et al., (2005a).

[14] The upward trend is consistent with growth in the awareness and attention to intellectual capital issue during the 1990s.

[15] Data for the Bukh et al. (2005a) study is from 1990 to 2001. Whilst not a specific parallel to our study the Bukh et al. (2005a) study provides a basic benchmark.

[16] As the number of items in each major category varies a comparison of raw disclosure between categories is not prudent. Caution should be taken if making any such comparison. Due to difficulty in making such a comparison we do not provide any commentary in this paper on any cross-category comparisons.

[17] IPOs opting to disclose less intellectual capital information in their prospectus may have different organisational characteristics than IPOs disclosing more (Bukh et al., 2005a). For instance, a smaller IPO may opt not to disclose as much intellectual capital information due to the threat of competitive pressures from larger firms. Larger IPOs, however, may not be subject to this disincentive. Table 3, Panel A describes various organisational characteristics for the pooled sample. Using the median value (for the pooled sample and by year) for each organisational characteristic as the cut-off point we conducted statistical tests to determine if the level of intellectual capital disclosure may have been significantly influenced by relevant firm-specific characteristics. Any significant variations noted may have inferred possible self-selection bias. Between and within tests (not tabulated for brevity) did not indicate any significant differences in the level of intellectual capital disclosure (for the pooled sample or individual years) due to the firm-specific characteristics listed in Table 3, Panel A. Based on these findings we conclude that self-selection bias is not a significant concern with the sample.

Table 3
Descriptive statistics

Panel A: Annualised breakdown of raw IC disclosure by major category

Year	*Total*	*HRM*	*CC*	*ITC*	*PC*	*RandDC*	*SC*
1997 (n = 11)	15.091	6.636	1.636	0.818	1.818	0.545	3.636
1998 (n = 20)	16.000	5.100	1.800	0.050	2.000	1.750	5.300
1999 (n = 44)	19.205	6.909	1.977	1.159	2.364	1.841	4.955
2000 (n = 63)	20.714	7.730	2.222	0.635	2.397	2.286	5.444
2001 (n = 33)	20.576	8.394	1.848	0.394	2.606	1.727	5.606
2002 (n = 27)	23.000	9.074	3.148	0.111	2.889	2.185	5.593
2003 (n = 51)	28.863	10.098	4.686	0.882	3.353	2.745	7.098
2004 (n = 77)	24.429	9.416	2.403	0.494	3.312	2.883	5.922
2005 (n = 63)	22.175	8.413	1.952	0.540	2.921	2.587	5.762
2006 (n = 55)	26.145	9.218	3.527	0.891	3.364	3.200	5.945
Total (n = 444)	22.802	8.480	2.631	0.637	2.869	2.439	5.745

Panel B: Annualised breakdown of $ICDisc_j$

Year	*Mean %*	*Standard deviation*	*25th percentile*	*Median*	*75th percentile*
1997 (n = 11)	18.631	3.763	16.049	19.753	20.988
1998 (n = 20)	19.753	5.650	14.815	18.519	23.148
1999 (n = 44)	23.709	6.592	20.370	23.457	27.160
2000 (n = 63)	25.573	5.978	20.988	24.691	29.630
2001 (n = 33)	25.402	5.711	20.988	24.691	28.395
2002 (n = 27)	28.395	4.926	25.926	27.160	33.333
2003 (n = 51)	35.633	7.230	31.173	35.802	40.741
2004 (n = 77)	30.159	7.025	24.691	29.630	35.494
2005 (n = 63)	27.376	6.835	22.395	27.115	31.752
2006 (n = 55)	32.278	6.911	26.498	31.992	41.643
Total (n = 444)	28.150	7.336	20.117	27.994	33.943

Panel C: Control variable descriptive statistics (N = 444)

Control variable$^{\Phi}$	*Mean*	*Standard deviation*	*25th percentile*	*Median*	*75th percentile*
α_j	0.791	0.065	0.733	0.760	0.822
$EDOR_j$	–0.744	0.212	–0.833	–0.642	–0.621
$HerfIndCon_j$	0.192	0.091	0.141	0.188	0.211
$CGScore_j$	2.321	0.381	1.652	2.247	2.402
Aud_j	79.962				
Und_j	69.951				
Sol_j	41.381				
Lev_j	0.592	0.292	0.408	0.562	0.712
$ExeCP_j$	47.224				
Gross proceeds	$40,150,708	$47,491,448	$4,600,130	$10,350,000	$68,221,000
$LnGP_j$	16.606	0.988	15.242	16.587	17.006
Age in days	2,100	4,091	250	881	4,572
Age_i	6.749	1.527	5.544	6.507	8.181

Where:
See Table 1 for definitions of variables.
‡ – Of all the dependent, independent and control variables ANOVA tests indicate only significant variations in mean values between each year of the review period for $EDOR_j$ and Age_i.
Φ – The control variables are all shown in italics. Variables not in italics are supplementary information related to respective control variables before transformation. For all control variables measured using a dichotomous scale (i.e. Aud_j, Und_j, Sol_j and $ExeCP_j$) the value reported is the percentage of the sample that employed the services of a Big Four audit firm, prestige underwriter and/or highly reputable solicitor firm, and those with bonuses and stock options as a component of the executives compensation package. For example, 79.962% of the sample (or 355 IPOs of 444) engaged a Big Four audit firm.

5.3. Correlation matrix

Table 4 presents a correlation matrix with the upper half reporting Pearson pairwise correlation coefficients (cr_p), the lower half Spearman correlation coefficients (cr_s). $ICDisc_j$ is positively significantly correlated with $EDOR_j$ ($p<0.01$, cr_p and cr_s). The directional sign on both Pearson and Spearman correlations is consistent with our expectations and other related work (e.g. Jog and McConomy, 2003; Guo et al., 2004). $ICDisc_j$ is also positively significantly correlated with $CGScore_j$ ($p<0.05$, cr_p and cr_s). Again, these results are consistent with our expectations.

$ICDisc_j$ is also positively significantly correlated with: (a) Und_j ($p<0.01$, cr_p and cr_s); (b) Lev_j ($p<0.01$, cr_p and cr_s); and (c) Age_j ($p<0.05$, cr_p and cr_s). Meanwhile, the dependent variable is negatively significantly correlated with Sol_j ($p<0.01$, cr_p and cr_s) and $LnGP_j$ ($p<0.01$, cr_p and cr_s). Directional signs on all significant correlations between dependent and control variables are as expected (e.g. Firth and Liau-Tan, 1998; Jog and McConomy, 2003). There are no meaningful correlations between the independent variables that imply any significant issues in interpreting multiple regression results. Finally, significant correlations between control variables are noted. The maximum Pearson (Spearman) correlation being between Lev_j and $LnGP_j$ ($p<0.01$, cr_p and cr_s) is 0.425 (0.451) is below critical levels (i.e. 0.8, see Hair et al., 1995; Greene, 1999) for multicollinearity to be a serious concern in OLS regression analysis. Variance inflation factor (VIF) scores also calculated (not tabulated) further indicated no serious problems with multicollinearity.[18]

5.4. Regression findings

A series of OLS regressions are reported in Table 5. Base model results are reported in Panel 1 whilst regressions testing H1, H2 and H3 respectively are shown in Panels 2, 3 and 4. Coefficients on $EDOR_j$ are positive and significant ($p<0.05$, two-tailed significance) in the regressions reported in Panels 2, 3 and 4. This result is consistent with our expectations and supports the acceptance of H1. The coefficients on $HerfIndCon_j$ are negative and significant ($p<0.10$, two-tailed significance) in Panels 3 and 4 implying that IPOs entering more concentrated business sectors reported less intellectual capital information in their listing prospectuses. The result of importance with respect to H2, however, is the coefficients on the interaction term $EDOR_j$*$HerfIndCon_j$ where in Panels 3 and 4 they are both negative and significant ($p<0.05$, two-tailed significance). Results related to this interaction term are consistent with the expectations of H2. The coefficient on $CGScore_j$ is positive and moderately significant ($p<0.10$, two-tailed significance) in Panel 4 results. This result is consistent with the expectation that better governance is likely to prompt greater transparency. For our study the term of importance in Panel 4 is the coefficient on the three-way interaction term. The result of importance in respect to H3, however, is the coefficients on the interaction term $EDOR_j$*$HerfIndCon_j$*$CGScore_j$. Findings show that whilst the directional sign on $EDOR_j$*$HerfIndCon_j$*$CGScore_j$ is as expected the coefficient is insignificant. This result, therefore, does not support the acceptance of H3.

With respect to the control variables coefficients on Und_j are positive and significant ($p<0.01$ Table 5, Panels 1–4, two-tailed significance). The positive and significant result suggests that IPOs engaging a higher quality underwriter were likely to disclose more information than counterparts using the services of a lower quality underwriter. The additional disclosure could be the result of pressure on the IPO from the high quality underwriter seeking to preserve their reputation capital. Conversely, coefficients on Sol_j are all negative and significant ($p<0.05$, Table 5, Panels 1 and 2; $p<0.10$, Table 5, Panels 3 and 4; two-tailed significance). Results for Sol_j appear contrary to a 'reputation capital' proposition for additional disclosure. Rather, the negative and significant results may imply IPOs engaging a high quality legal firm may have been advised to limit excess disclosure so as to avoid possible future litigation as over ambitious conclusions are drawn by investors from greater disclosure. Consistent with expectations, the coefficients on Lev_j ($p<0.05$, Table 5, Panels 1–4; two-tailed significance) and Age_j ($p<0.05$, Table 5, Panel 1–3; $p<0.10$, Panel 4; two-tailed significance) are positive and statistically significant. Coefficient on $LnGP_j$, meanwhile, is negative and statistically significant implying that IPOs seeking to raise greater funds were less forthcoming in disclosing information on intellectual capital at the time of listing than those raising less funds. Finally, Aud_j ($ExeCP_j$) coefficients are positive (negative) but insignificant in all models.

5.5. Robustness tests

To check the robustness of our main findings we conducted several additional tests. For example, prior disclosure research frequently cites firm size and industry as having a significant influence on disclosure practices. Consequently, we partitioned the sample into: (a) small and large firm sub-samples based on proceeds raised; and (b) manufactur-

[18] The highest calculated VIF is 3.81. As VIFs in excess of 10 are deemed to be evidence of serious multicollinearity (Netter et al., 1989: 40) standard interpretations of the regression coefficients presented in the tables can be made. Other diagnostics (eigenvalues and condition values) further suggest that multicollinearity is not a significant problem.

Table 4
Correlation (Pearson and Spearman) Matrix

Variable	$ICDisc_j$	$HerfIndCon_j$	$CGScore_j$	$EDOR_j$	Aud_j	Und_j	Sol_j	Lev_j	$ExeCP_j$	$LnGP_j$	Age_j
$ICDisc_j$		–0.231*	0.117**	0.154*	0.012	0.134*	–0.235*	0.125**	0.026	–0.115**	0.107**
$HerfIndCon_j$	–0.218*		–0.084	–0.021	0.161*	–0.008	–0.026	–0.032	–0.042	–0.161*	–0.149*
$CGScore_j$	0.092**	–0.015		–0.109**	–0.049	–0.128**	–0.056	–0.182*	0.125**	0.036	0.087
$EDOR_j$	0.164*	–0.091	–0.068		–0.001	–0.049	0.054	0.270*	0.384*	0.306*	–0.020
Aud_j	0.015	0.182*	–0.066	0.019		0.046	0.167*	0.218*	0.107**	0.239*	0.074
Und_j	0.156*	–0.011	–0.133*	–0.089	0.032		–0.029	0.013	–0.052	–0.001	0.152*
Sol_j	–0.222*	–0.012	–0.049	0.076	0.167*	–0.029		0.133*	0.052	0.205*	–0.081
Lev_j	0.141*	–0.059	–0.121**	0.335*	0.218*	0.013	0.133*		0.179*	0.425*	0.063
$ExeCP_j$	0.043	–0.083	0.158*	0.399*	0.107**	–0.052	0.052	0.179*		0.221*	–0.035
$LnGP_j$	–0.146*	–0.101**	0.038	0.338*	0.250*	–0.017	0.224*	0.451*	0.257*		–0.053
Age_j	0.102**	–0.076	0.119**	–0.048	0.082	0.149*	–0.082	0.056	–0.027	–0.064	

Where:
See Table 1 for definitions of variables.
* and ** – Significant at 0.01 and 0.05 or better respectively (two-tailed significance).

Table 5
Multivariate tests

Variable	Panel 1: *Base model*	Panel 2: *Test of H1*	Panel 3: *Test of H2*	Panel 4: *Test of H3*
Intercept	0.061 (0.78)	0.077 (0.83)	0.245 (1.27)	0.231 (1.14)
Control variables				
Aud_j	0.005 (–0.09)	–0.017 (–0.17)	–0.030 (–0.51)	–0.026 (–0.44)
Und_j	0.125 (2.97)*	0.122 (2.92)*	0.123 (2.95)*	0.118 (2.82)*
Sol_j	–0.086 (–2.04)**	–0.084 (–2.01)**	–0.074 (–1.77)‡	–0.071 (–1.67)‡
Lev_j	0.123 (2.53)**	0.117 (2.39)**	0.122 (2.47)**	0.018 (2.38)**
$ExeCP_j$	–0.048 (–0.50)	–0.046 (–0.42)	–0.079 (–0.74)	–0.077 (–0.73)
$LnGP_j$	–0.067 (–2.03)**	–0.062 (–2.01)**	–0.055 (–1.88)‡	–0.040 (–1.79)‡
Age_j	0.130 (2.24)**	0.138 (2.32)**	0.124 (2.03)**	0.112 (1.92)‡
Test variables				
$EDOR_j$		0.106 (2.39)*	0.100 (2.26)**	0.099 (2.24)**
$HerfIndCon_j$			–0.091 (–1.89)‡	–0.089 (–1.75)‡
$EDOR_j$*$HerfIndCon_j$			–0.123 (–2.23)**	–0.116 (–1.99)**
$CGScore_j$				0.120 (1.91)‡
$EDOR_j$*$CGScore_j$				0.084 (2.21)**
$HerfIndCon_j$*$CGScore_j$				0.029 (0.81)
$EDOR_j$*$HerfIndCon_j$*$CGScore_j$				0.169 (1.14)
Model summary:				
F-Statistic	7.53*	8.50*	8.64*	8.82*
Adjusted R^2	0.2390	0.2751	0.2905	0.2914
N	444	444	444	444

Where:
See Table 1 for definitions of variables.
The regression results reported in Panel 1 are based on Equation 1 excluding all test variables whilst results reported in Panel 2 are based on the complete *Equation 1*. Panel 3 results, meanwhile, are based on *Equation 2*. Finally, the regression results reported in Panel 4 are based on *Equation 3*.
*, ** and ‡ – Significant at 0.01, 0.05 and 0.10 or better respectively (two-tailed significance with t-statistic based on White's heteroscedasticity-consistent covariance matrix).

ing and non-manufacturing industry sub-samples. Regression analysis performed again on the respective sub-samples did not yield any significantly different results then that reported in Table 5. That is, results hold for both small and large firms and those from both manufacturing and non-manufacturing industries. A review of the various disclosure and IPO studies indicates a number of factors investigated could have been included as possible control variables. Whilst we have sought to have been as comprehensive as possible in our research method development, it is difficult to ignore the possibility that omitted variables may influence our reported results. As a consequence we conducted additional analysis involving the inclusion of other previously identified factors as controls for cross-sectional variations. Factors used in these additional tests included operating performance (pre- and post-IPO), firm's earnings growth and venture capitalist involvement. Again, additional tests using extra control variables did not yield different findings reported in Table 5. Finally, we varied the measurement of some of the independent and control variables. For instance, in the case of $CGScore_j$, rather than have a range from zero to three, we used a dichotomous scale whereby a firm is scored one if at least two of the three conditions are met otherwise zero. All tests using alternative proxy measures for select independent and control variables do not result in any significant differences from Table 5 results.

6. Concluding remarks

Since its initial evolution, scholarly research into intellectual capital has followed several streams of enquiry. Aside from considerable attention given to defining and modelling of intellectual capital, or the measurement of intellectual capital and its respective components, growing attention has focused on the reporting of intellectual capital-related information. Schrand and Verrecchia (2004) report disclosure research can be categorised into

three main streams: (1) nature and type of information reported; (2) determinants underlying disclosure; and (3) consequences of accounting information disclosures. At present, studies examining intellectual capital reporting concentrated on issues related to Schrand and Verrechia's (2004) first stream. Of the few intellectual capital disclosure studies examining the determinants of disclosure, the vast majority rely on traditional factors (e.g. firm size, economic performance, industry) whilst examining conventional modes of investor communication (i.e. the annual report). Our study differs in two important ways. First, we look to examine the amount and nature of intellectual capital disclosure within an IPO setting. Second, we seek to determine the association between intellectual capital disclosure and ownership retention at the time of listing, plus the interaction effects of proprietary costs and corporate governance structure.

Our analysis of 444 IPOs listing on the SGX between 1 January 1997 and 31 December 2006 indicates the amount of intellectual capital information disclosed in prospectuses on average grew annually from 1997 to 2003. This was followed by two years of decline before a rebound in 2006. Disclosure associated with human resource capital, customer capital and process capital themes followed similar paths to that of the overall level of intellectual capital disclosure. In contrast, the pattern of average disclosure related to information technology capital, research and development capital and strategic capital themes varied more radically from year-to-year.

Consistent with our predictions, we find a positive association between the extent of intellectual capital disclosure and ownership retention. Specifically, our results imply that when *pre*-IPO owners retained a higher level of ownership in the entity *post*-IPO there is a greater willingness to provide investors with greater insights into the IPO's intellectual capital resource base and potential. The positive intellectual capital disclosure – ownership retention linkage may be indicative of a broader complementary firm quality – transparency relationship. Various IPO researchers argue greater ownership is a reflection of an IPO's quality. Conscious of the signalling effect of ownership retention, *pre*-IPO owners may wish to supplement this perception when providing greater transparency to reinforce confidence amongst investors in the IPO's quality. Given the costly nature of signals, our results suggest that as intellectual capital is still in its infancy and not fully understood by market participants (Johanson, 2003), IPO issuers are willing to retain a higher level of ownership as a complementary signal to reinforce the quality and value relevance of the intellectual capital information disclosed.

Additional analysis in consideration of the possible inhibiting effects of proprietary costs (as predicted by H2) on the positive intellectual capital disclosure – ownership retention association indicates a negative significant interaction influence. This result implies that whilst an IPO with greater ownership retention *post*-IPO is likely to have disclosed more intellectual capital-related information in the prospectus, the extent of disclosure would have been tempered for those firms entering a business sector with greater proprietary costs. That is, due to the threat of competition in highly concentrated industries an IPO entering these business sectors appears reluctant to disclose intellectual capital information in greater quantity for fear of losing a competitive advantage.

Given the mounting interest related to the impact of corporate governance on business operations including that related to disclosure we extended our analysis in examining if better corporate governance structures upon listing influenced the ownership retention – proprietary cost interaction on intellectual capital disclosure levels. Analytical tests did not support our predictions of a significant positive influence on the aforementioned interaction.

Our findings have implications for various parties. For instance, issuers could be at a greater disadvantage if intellectual capital disclosures are not used for any strategic objective. If the disclosure of more intellectual capital does not assist to reduce underpricing or improve long-term post-issue stock performance but provides key information to competitors – thereby reducing the IPO's competitive advantage – then the issuers will be exposed to additional costs of capital. However, if the disclosure of intellectual capital information can be used strategically to effectively reduce information asymmetry and improve investor and analyst valuations then the differential between the issue and first-day offer price can be narrowed. As the amount of 'money left on the table' decreases, the cost of capital is reduced.[19] Our findings may also have implications for policymakers if greater intellectual capital disclosure is creating a speculative IPO environment. If investors are bidding up the price they are willing to pay for an IPO based on intellectual capital disclosures, without knowing all the related risks (such as that associated with the intangible nature of intellectual capital), an unhealthy speculative environment could evolve. This is particularly true if issuers are seeking to exploit this position. Policymakers with the ability to prescribe reporting standards could introduce a

[19] The phrase 'money left on the table' is commonly used in IPO literature. This phrase refers to underpricing where 'money left on the table' is the capital lost when the company raises a level of funds at a given issue price when it could have raised the same amount of capital if stock had been offered at a higher price.

basic set of practices to enhance consistency and comparability in the disclosure of intellectual capital information.

Whilst our study contributes to an understanding of the consequences of intellectual capital disclosures, it is not without some caveats. For example, our analysis only allows us to identify an association and not a causal relationship. Future research may seek to develop a research method to determine precisely how issuers are using intellectual capital disclosures in the IPO process. This may involve a: (i) closer examination of the precise nature of the intellectual capital disclosure (i.e. good versus bad, qualitative versus quantitative, etc); (ii) precise placement of the intellectual capital disclosure in the prospectus; or (iii) intellectual capital disclosure in the prospectus relative to related disclosures via other mechanisms (i.e. media reports, financial analysts reports, etc.). Also, this study only uses IPO data from a single capital market. This may make general extrapolation to other domestic settings problematic because institutional structures in Singapore that are contributing to the positive intellectual capital disclosure–ownership retention may differ significantly in other jurisdictions. Furthermore, the interaction influence of proprietary costs could vary in nations where business sector concentrations differ. Research using data from other domestic settings is warranted to determine the precise nature of the intellectual capital disclosures and determinants examined in our study.

Despite some noted caveats, our study is one of the first to provide valuable insights into the determinants of intellectual capital disclosure beyond traditional factors and also in an alternative setting (i.e. IPO). This contribution is important given the growing significance of intellectual capital to a firm's sustainable competitive advantage. Also, it opens a new avenue for intellectual capital research. Our findings imply a possible need to rethink the general reasons and incentives underlying why IPOs in the 'new economic' era may or may not be disclosing new emerging types of financial and non-financial information such as that related to intellectual capital.

Appendix A
Intellectual Capital Disclosure Index

Item Category and Item Description
Human Resources (28 items)
Employee breakdown by age
Employee breakdown by seniority
Employee breakdown by gender
Employee breakdown by nationality
Employee breakdown by department
Employee breakdown by job function
Employee breakdown by level of education
Rate of employee turnover
Comments on changes in the number of employees
Comment on employee health and safety
Employee absenteeism rate
Comments on employee absentee rate
Discussion of employee interviews
Statements of policy on competency development
Description of competency development programmes and activities
Education and training expenses
Education and training expenses by number of employees
Employee expenses by number of employees
Recruitment policies of the firm
Separate indication firm has a HRM department, division or function
Job rotation opportunities
Career opportunities
Remuneration and incentive systems
Pensions
Insurance policies
Statements of dependence on key personnel
Revenues to employee
Value added to employee

Appendix A
Intellectual Capital Disclosure Index *(continued)*

Item Category and Item Description
Customers (14 items)
Number of customers
Sales breakdown by customer
Annual sales per segment or product
Average purchase size by customer
Dependence on key customers
Description of customer involvement in firm's operations
Description of customer relations
Education/training of customers
Ratio of customers to employees
Value added per customer or segment
Absolute market share (%) of the firm within its industry
Relative market share (not expressed as percentage) of the firm
Market share (%) breakdown by country/segment/product
Repurchases by customers
Information Technology (6 items)
Description of investments in information technology
Reason(s) for investments in information technology
Description of existing information technology systems
Software assets held or developed by the firm
Description of intellectual technology facilities (e.g. buildings)
Information technology expenses
Processes (9 items)
Information and communication within the company
Efforts related to the working environment
Working from home
Internal sharing of knowledge and information
External sharing of knowledge and information
Measure of internal processing failures
Measure of external processing failures
Discussion of fringe benefits and company social programs
Outline of environmental approvals and statements/policies
Research & Development (9 items)
Statements of policy, strategy and/or objectives of R&D activities
R&D expenses
Ratio of R&D expenses to sales
R&D invested into basic research
R&D invested into product design and development
Details of future prospects regarding R&D
Details of existing company patents
Number of patents and licenses etc.
Information on pending patents
Strategic statements (15 items)
Description of new production technology
Statements of corporate quality performance
Information about strategic alliances of the firm
Objectives and reason for strategic alliances
Comments on the effects of the strategic alliances
Description of the network of suppliers and distributors

Appendix A
Intellectual Capital Disclosure Index *(continued)*

Item Category and Item Description
Strategic statements (15 items) *(continued)*
Statements of image and brand
Corporate culture statements
Statements about best practices
Organisational structure of the firm
Utilisation of energy, raw materials and other input goods
Investment in the environment
Description of community involvement
Information on corporate social responsibility and objective
Description of employee contracts/contractual issues

Disclosure index adapted from Beaulieu et al. (2002), Bukh et al. (2005a) and Williams (2001)

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